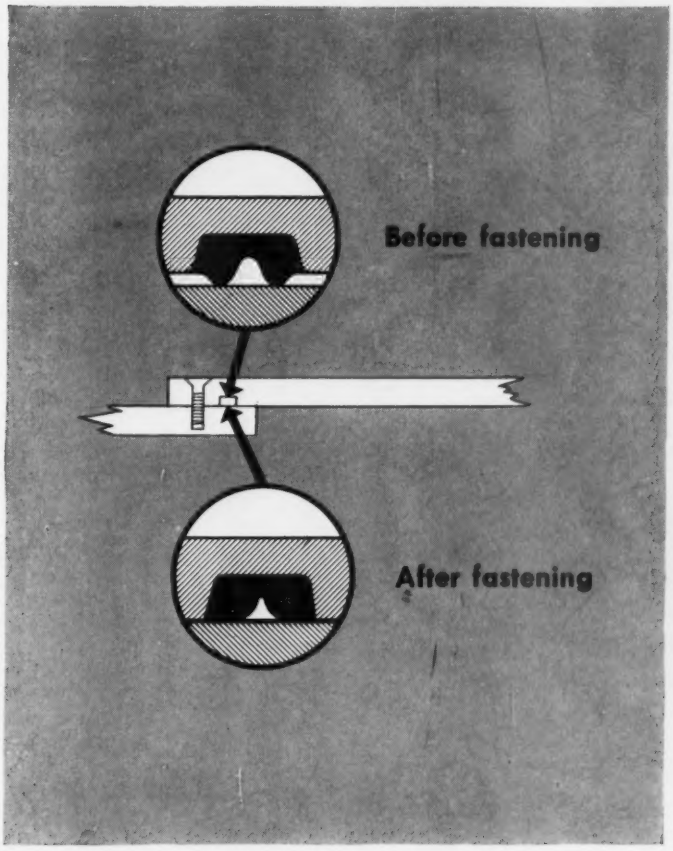
Another new development using

B.F.Goodrich Chemical *raw materials*



Diagrams show functioning of Gask-O-Seal, manufactured by Parker Seal Co., a Division of Parker-Hannifin Corporation, Culver City, Calif. Photo shows flexibility of application to a wide variety of gasketing problems. B.F.Goodrich Chemical Company supplies the Hycar nitrile rubber materials.

uses glands of Hycar

NEW GASKET IDEA PROVIDES SAFE, SURE STATIC SEALING

ZERO-LEAKAGE is a prime requirement when operations call for handling hot oil or chemicals. This new type gasket provides perfect sealing economically with controlled confinement of a gland seal made from Hycar nitrile rubber.

Because they are made of Hycar, these gland seals will not creep under stress. They also resist oxidation, hot oil and many other solvents. Yet their memory of shape is just right to make them resist deformation, provide a perfect tight seal.

Hycar may be the material that can add new advantages to your product, or suggest new applications. For information, write Dept. KA-11, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Hycar
American Rubber

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

SEE US AT BOOTH NO. 509
8TH NATIONAL
PLASTICS EXPOSITION
NOV. 17-21
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B.F.Goodrich

GEON polyvinyl materials • HYCAR American rubber and latex
GOOD-RITE chemicals and plasticizers • HARMON colors

PHILBLACK
PHILBLACK
PHILBLACK

Philblack* E is top of the class!

When Philblack E graduates from the nation's largest furnace black plant at Borger, Texas, he has passed a series of comprehensive examinations for uniformity, for outstanding performance in finished stock, tensile strength and abrasion resistance. And he stands at the top of the class in these important qualities.

Philblack E is the best-wearing black available. This remarkable super abrasion black easily solves difficult tire problems with its superb qualities. Ask your Phillips technical representative for more information about Philblack E.

*A trademark

LET ALL THE PHILBLACKS WORK FOR YOU!

A **Philblack A, Fast Extrusion Furnace Black.** Excellent tubing, molding, calendering, finish! Mixes easily. Disperses heat. Non-staining.

O **Philblack O, High Abrasion Furnace Black.** For long, durable life. Good conductivity. Excellent flex life and hot tensile. Easy processing.

I **Philblack I, Intermediate Super Abrasion Furnace Black.** Superior abrasion. More tread miles at moderate cost.

E **Philblack E, Super Abrasion Furnace Black.** Toughest black yet! Extreme resistance to abrasion.

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Rubber Age

COVERING THE MANUFACTURE OF RUBBER AND RUBBERLIKE PLASTICS PRODUCTS

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*Appears every other month

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Highlights Sidelights *of the News . . .*

November, 1958

The Fifth Joint Army-Navy-Air Force Conference on Elastomer Research and Development, held on October 15 through 17, attracted over 240 visitors . . . The three-day meeting featured the presentation of 36 technical papers . . . The meeting was designed to coordinate research and development among the military services and to enlist top civilian talent in the solution of critical problems (page 293).

Our peripatetic staff visited different parts of the country during the past few weeks . . . Editor Lerner addressed the October 21st meeting of the Elastomer and Plastics Group of the Northeastern Section of the American Chemical Society, speaking on "Latest Developments in the Polymer Field" (page 296) . . . while Advertising Sales Manager Jansen addressed the October 24th meeting of the Rubber Chemical Salesmen's Association of Akron . . . Mr. Jansen spoke on "How Advertising Can Help the Rubber Chemical Salesman" (page 303).

Goodyear has realigned its executive staff with E. J. Thomas named chairman of the board succeeding P. W. Litchfield who has become honorary chairman . . . Russell DeYoung, formerly executive vice-president, has been elected president succeeding Mr. Thomas . . . Mr. Thomas, incidentally, continues as the company's chief executive officer (page 297).

Germany has just about become self-sufficient in respect to synthetic rubber with the opening of a new installation at Marl . . . The new plant is designed for an initial output of 45,000 long tons a year . . . With technical improvements realized during construction, however, the plant may be able to turn out 70,000 long tons a year (page 301).

According to recent surveys, the Puerto Rican rubber industry is in a period of rapid growth . . . It is pointed out that the tax situation in Puerto Rico is particularly inviting to the manufacturer of a great variety of rubber end products . . . Many American companies are already active in the area selling to the Caribbean area with its population of 50 million (page 308).

September 29 marked the fifteenth anniversary of the first commercial production of synthetic rubber in Canada . . . With a plant originally designed to produce 41,000 long tons of general purpose synthetic, the company produced some 130,000 long tons in 1957 (page 322).

Died, on October 7, Theodore A. Werkenthin, well-known to the rubber industry (page 326).

A BASIC SOURCE FOR COMPOUNDING NEEDS

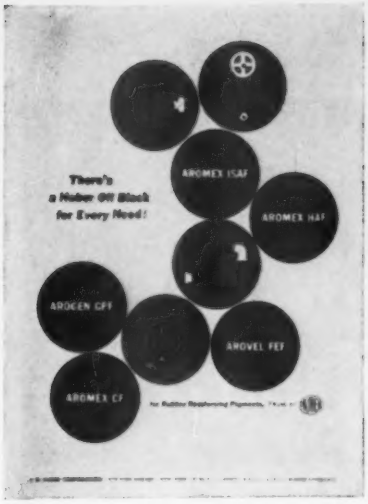
CARBON BLACKS

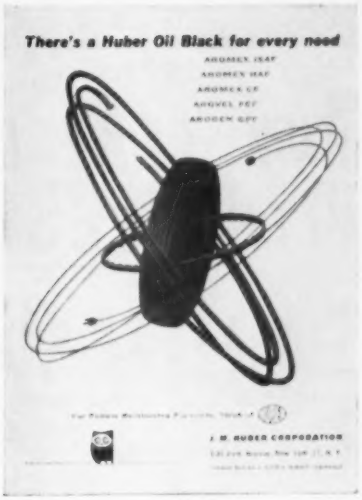
CLAYS

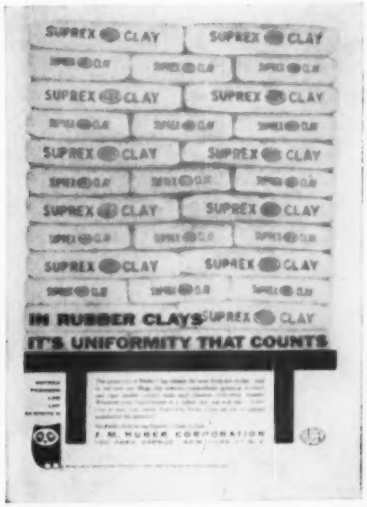
CHEMICALS

PIGMENTS

For Rubber Reinforcing Pigments, Think of Huber







HUBER **J. M. HUBER CORPORATION** 100 PARK AVE., NEW YORK 17, N.Y.

Wise Owls read Huber Technical Data. Ask to be put on our mailing list.

Is A Reputation For Product Quality Worth Less Than...

WHY TAKE CHANCES WITH Secondary ZnO!

Variation in lead content of Zinc Oxide not only affects rate of cure of a rubber compound with some accelerator systems, but also causes variability of color from batch to batch through formation of lead sulfide during cure. Variation in total sulfur also affects rate of cure as well as water absorption of the rubber product. Presence of grit can cause failures—especially in thin-walled rubber products. Since secondary zinc oxides are produced from die casting scrap, dross, skimmings or zinc residues, a high degree of content-variability is inevitable. *For a matter of less than two pennies per pound, secondary zinc oxide users run this risk.*

ST. JOE lead-free ZINC OXIDES are produced by a patented electrothermic method—a modification of the direct-from-ore, or American Process. The same ores, equipment and procedure used in the smelter for the production of 99.98% high-grade slab zinc, which commands a premium market price, also are used in the production of our zinc oxides. With the recent addition of a direct-reading spectrometer and electron microscope to existent facilities, this company's quality control equipment is now second to none in the zinc industry.

Use Primary Zinc Oxides... Better Still, Use LEAD-FREE ST. JOE ZINC OXIDE ZINC OXIDES!

In our Josephtown laboratories, two lots of secondary zinc oxide from the *SAME* supplier analyzed as follows:

	Lot #1	Lot #2
PbO	.04	.11
Total Sulfur	.15	.32
Gritty Particles: (Silica, Dust, Dirt, Metallics)	Present	Present

ZnO-120

ST. JOSEPH LEAD COMPANY

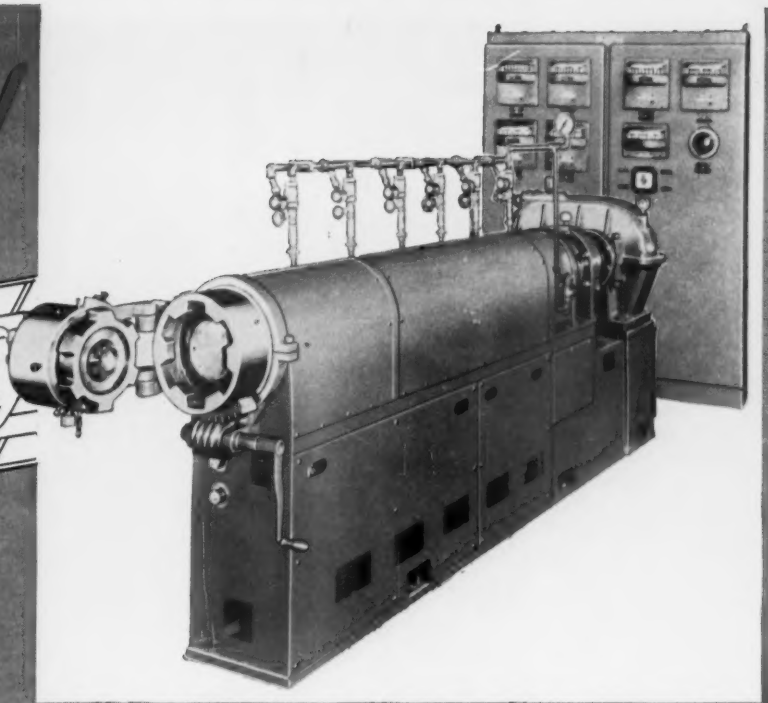
ST. JOE

250 Park Avenue, New York 17, N.Y.
Plant & Laboratory:
Monaca (Josephtown), Pa.

NEW!

HIGH PRESSURE

EXTRUDER



INDUCTION HEAT, with the Kullgren temperature control system, has these advantages: fast heat-up (to 400° in 20 minutes), low-cost operation at high temperatures, quick cooling, and "on-the-button" control.

HIGH PRESSURE screw and cylinder with all parts designed for long life at operating pressures up to 10,000 psi.

QUICK OPENING HEAD maintains a tight seal at the maximum pressures of 10,000 psi.

HIGH SPEED for increased production (150 rpm on a 3½-inch screw). All gearing and bearings designed for high-horsepower drives.

PRESSURE CONTROL by means of screw orifice can be adjusted continuously, manually or automatically, while running.

QUALITY . . . better quality and increased production result from the use of CONTROLLED HIGH PRESSURE dies and extruders. New plastics coming on stream will emphasize the advantage of HIGH PRESSURE EXTRUSION.

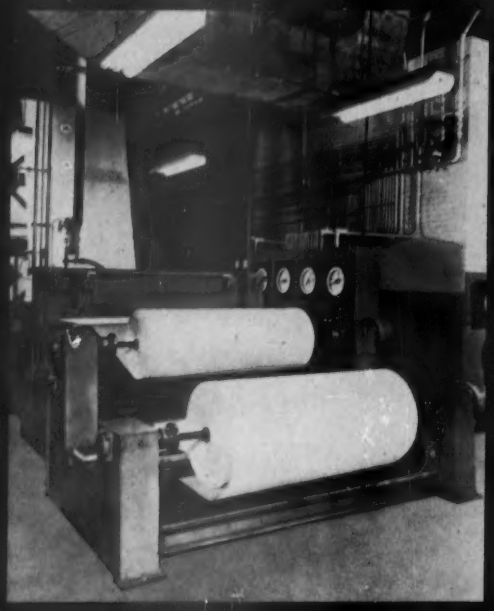
Aetna-Standard is currently delivering high pressure induction-heated extruders and dies. These machines are available in all standard sizes in addition to the well-known line of standard extruders.

Sales and Engineering

HALE AND KULLGREN, INC. • AKRON, OHIO

AETNA ENGINEERING COMPANY STANDARD

PITTSBURGH, PENNSYLVANIA



TEN THOUSAND TONS OF TOP-NOTCH TIRE CORD A YEAR

A smooth-running production line with the ability to produce more than 20,000,000 pounds of precisely treated tire cord in 'round-the-clock operation makes sweet music to everyone in the plant — from the production operators to the board of directors.

Such equipment is *not* developed by following dated rules of thumb in design . . . by incomplete attention to tough engineering problems . . . by cutting construction corners . . . or by lack of focus on tomorrow's trends in process and materials.

Whether your need is for a large volume unit or small . . . single, dual or triple-zone treatment . . . for medium speed or truly high-speed operation . . . for handling conventional or "horizon" fibers . . . avail yourself of the broad experience of the forward-thinking engineers of the C. A. Litzler Co.— designer and builder of the world's most productive tire cord installations . . . around the globe.

C. A. LITZLER CO., INC.

SOUND ENGINEERING FOR TOMORROW'S PRODUCTION

1817 BROOKPARK RD. CLEVELAND 9, OHIO CABLE "CALITZ"

EXPORT REPRESENTATIVE: GILLESPIE & CO. OF N. Y., 96 WALL ST., NEW YORK 5, N. Y.

LICENSED FABRICATORS: Benno Schilde Maschinenbau A. G. Bad Hersfeld, Germany; Soc. Alsacienne de Constructions Mecaniques Paris, France; Mather & Platt, Ltd. Manchester, England

GIVES RUBBER COMPOUNDERS

THE FIRST TRULY EFFECTIVE COMBINATION

OF STABILIZER, ANTIOXIDANT AND ANTIOZONANT

(and is available for use as an additive or already incorporated in three new PLIOFLEX rubbers)

GOODYEAR

CHEMICAL DIVISION

The Answer...

New and different WING-STAY 100—an essentially nontoxic, nonvolatile, mixed diaryl-p-phenylenediamine which uniquely combines the more desirable properties of a number of commercially available age resistors.

As a Stabilizer for SBR Rubbers...

WING-STAY 100 is the first major development since the early days of the GR-S rubbers and offers these advantages in discoloring-type polymers:

1 Incorporates in much the same manner as phenyl-beta-naphthylamine.

2 Provides resistance to oxidative degradation and flex-cracking which is much above the accepted minimum level.

3 Is vastly superior to the standard stabilizers in antiozonant activity.

4 Serves as a better stabilization building block for the compounder at no extra cost.

As an Additive for SBR Rubbers...

WING-STAY 100 is the first really effective combination of antioxidant and antiozonant for synthetic rubbers, as witnessed by the following:

1 Incorporates easily.

2 Does not accelerate the cure.

3 Does not bloom at normal levels.

4 Provides much better over-all protection at lower cost.

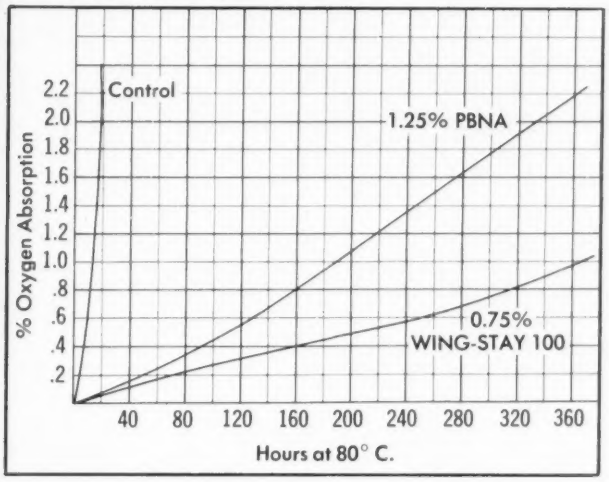
GOOD

CHEMICAL

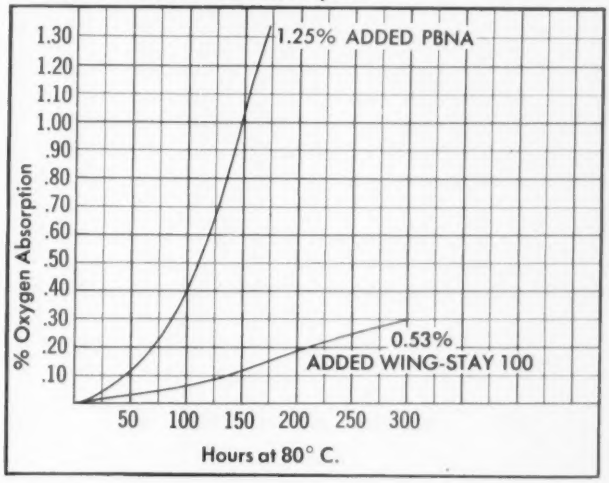
Here's the proof...

Here's graphic evidence of the greater effectiveness of WING-STAY 100 as either a basic stabilizer or an additive:

Effect of WING-STAY 100 on the stability of an Oil-Extended SBR Polymer.

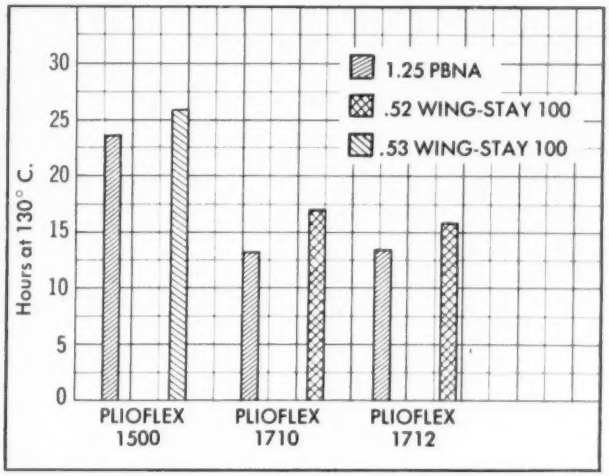


Effect of WING-STAY 100 as added stabilizer in a "cold" nonextended SBR Polymer.



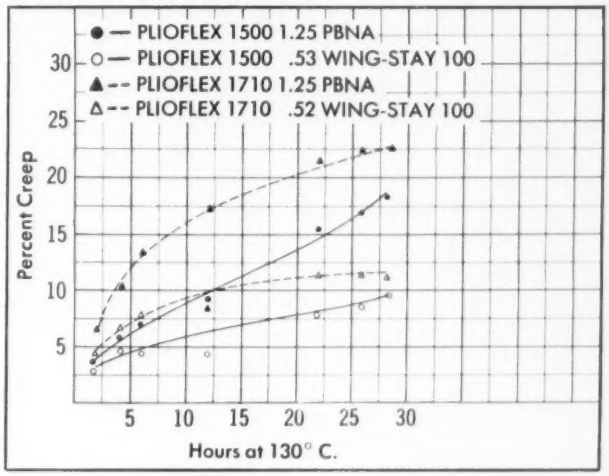
Creep Test on PLIOFLEX Polymers.*

(Vulcanized 50 Part HAF Black Compound • Hours to 10% Creep.)



Creep Test on PLIOFLEX Polymers.

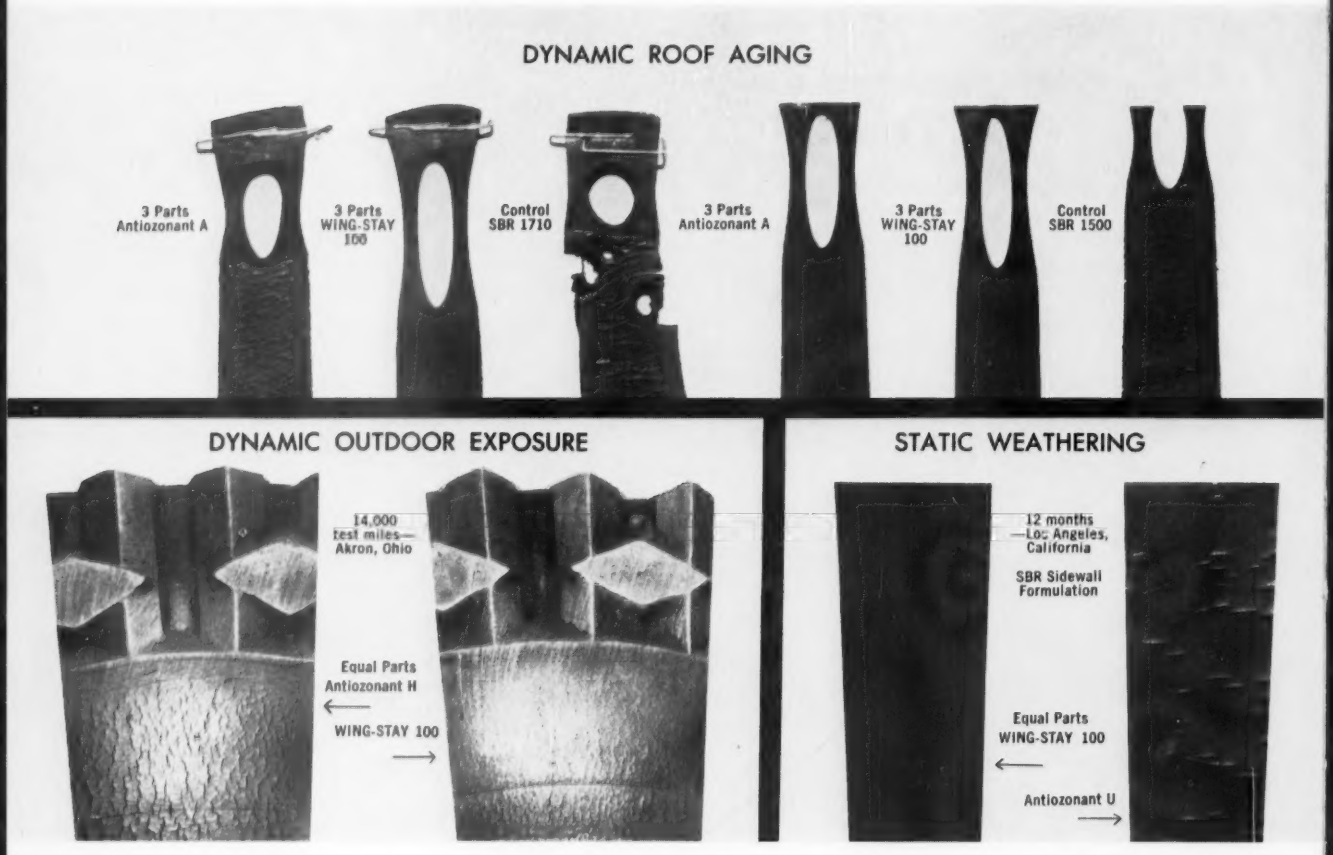
(Black Compounds Containing Copper To Magnify Oxidative Degradation)



**A measurement of oxidative degradation of rubber in air at elevated temperatures.*

But that's not all...

These actual photographs are further evidence of the superior activity of WING-STAY 100 as an antioxidant and antiozonant:



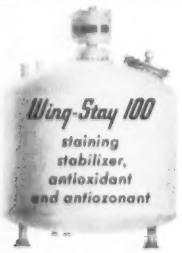
Why not prove it to yourself...

The best test is your own, so why don't you evaluate WING-STAY 100 as soon as possible? It's available, as an already-incorporated stabilizer in PLIOFLEX 1500C (a "cold," nonextended SBR), in PLIOFLEX 1710C (a "cold" SBR extended with 37½ parts of aromatic oil), and PLIOFLEX 1712C (a "cold" SBR extended with 37½ parts of highly aromatic oil).

Or you can obtain it as a safely and easily handled flaked solid for use as an additive protective agent. To get maximum protection at minimum cost, why not try WING-STAY 100 in combination with PLIOFLEX rubber stabilized with the same superior product.

Samples of WING-STAY 100 or of PLIOFLEX rubbers containing it – plus full technical assistance – are yours, simply by contacting your nearest Chemical Division representative or writing:

Goodyear, Chemical Division, Department W-9419,
Akron 16, Ohio



GOODYEAR

CHEMICAL DIVISION

Pliolex, Wing-Stay–T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

2 New *FEMCO Machines with One Idea in Mind—

BOOST YOUR DIE CUTTING PROFITS!

1 AUTOMATIC "Roll Feed" DIE CUTTER*

For Die Cutting Roll Stock automatically, accurately and fast you should investigate the new 84" x 72" FEMCO "Roll Feed" Die Cutter shown above. It handles such diversified padding, covering and cushioning stocks as supported and unsupported Vinyl Fabrics; Polyether Foam; supported Foam Rubber; Fiberglass; Curled Hair; "Tufflex" and other materials. It cuts fast—turning out perfect pieces in a 10-second cutting cycle.

Power driven feed rolls and imput conveyor draw the festooned stock into cutting position on the 42 square foot bed area. Steel rule dies are mounted either on the bed plate or on a new Die Handling mechanism which raises vertically above the bed plate. Dial-set roll pressure virtually eliminates costly "set-up" time. You push a button, the Die Cut is made and output conveyor and pinch rolls pull the Die Cut material and scrap off the cutting area, and a new cut starts. Write for complete specifications and a quotation today!

2 Heavy Duty ROLLER DIE CUTTER* *with new Vertical Die Handling Mechanism*

Here is a FEMCO 60" x 48" Heavy Duty Roller Die Cutter (above right) equipped with a new Die Handling mechanism which greatly expands the machine's potential use in Die Cutting thick materials.

This equipment successfully Die Cuts Polyether to 4" thickness; Foam Rubber to 2"; close cell Sponge to ½" thickness; open cell Sponge Rubber, supported and unsupported Vinyl Fabric; supported Foam Rubber; Cork Composition Gaskets; Abrasive Paper; Curled Hair; Fiberglas; "Tufflex" padding; rough cut Vinyl Floor Tile; high density Soling and uncured rubber stocks.

Dies are shown mounted in a steel frame positioned vertically above the bed area. When the frame holding the Dies is in the extreme upward position shown here it is 30" from the bed plate for easy loading and unloading of thick slab material, and to allow roll stock to move easily across the bed. When the die frame is automatically lowered into cutting position, the roller passes over the back of the Die Board, instead of directly over the dies and material.

Send us samples of your own stock and we will make trial cuts without obligation, giving you a detailed report on what FEMCO machines can do for you.

*Campbell Designed Machines

1917 41st YEAR OF SERVICE 1958

The FALLS ENGINEERING AND MACHINE CO.

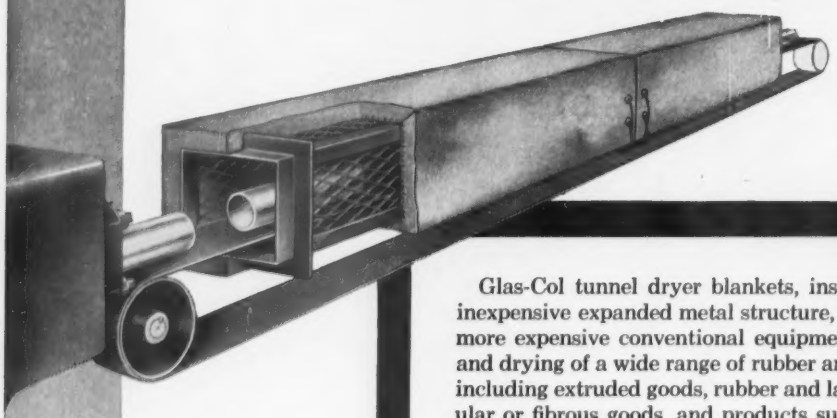
CUYAHOGA FALLS, O.

Write for information on FEMCO's new "FEF" Plan—a machinery financing arrangement which lets you pay as you profit. Also write or call to see movies in sound and color in your office showing our equipment in action.

for curing rubber, foam, vinyls . . .

NEW GLAS-COL

electric tunnel dryer blankets



Glas-Col tunnel dryer blankets, installed around an inexpensive expanded metal structure, can do the job of more expensive conventional equipment for the curing and drying of a wide range of rubber and vinyl products including extruded goods, rubber and latex thread, granular or fibrous goods, and products such as mattresses, pillows, and upholstery.

Glas-Col tunnel dryer blankets are well suited for curing and drying applications requiring temperatures up to 1000° F.

And, the cost of a tunnel dryer blanket installation is but a bare fraction of that of conventional equipment . . . heating costs are reduced, too!

Construction and Design: Glas-Col electric tunnel dryer blankets can be engineered for belts of any width or length. For flexibility of manufacture, shipping, installation and maintenance, the blankets are built in multiple units . . . each ranging from four to eight feet in length.

Heating elements, constructed of high-quality resistance wire embedded in layers of glass fabric, are positioned so that the same temperature is maintained from left to right and front to back of the tunnel dryer.

For additional information, contact Glas-Col Apparatus Company, Dept. RA, 711 Hulman Street, Terre Haute, Ind.

GLAS-COL

Trademark Registered U. S. Patent Office

ELECTRIC TUNNEL DRYER BLANKETS

U. S. Patents
2,282,078
2,739,220

U. S. Patents
2,231,506
2,739,221

Specialists in production, pilot plant and laboratory heating problems

Here's how UOP 88® and 288® work to protect your rubber products

The ozone damage problem is becoming progressively more acute, and not all antiozonant compounds can cope with the increasing ozone levels. Reported instances of deterioration of rubber goods due to ozone attack are often quite dramatic. In a high ozone concentration area an unprotected rubber article may actually show ozone damage in a few days. Where ozone levels are not so high, ordinary base stocks may crack in a year or less, even under static conditions.

Here's proof

Absolute protection of your rubber products is assured when you use UOP 88 or 288. At the UOP research laboratories, new antiozonant formulations are continually being tested in a variety of base stocks. In addition, many manufacturers have tested UOP antiozonants in their own laboratories and in use. One customer recently reported that in a test of UOP 88 in their base stock, the UOP antiozonant afforded complete protection for 230 hours of exposure under fixed conditions of strain of 50 pphm ozone. Another antiozonant used in the same recipe failed and the tire cracked after only 30 hours exposure, while the unprotected base stock cracked in 5 hours.

Select right antiozonant for best result

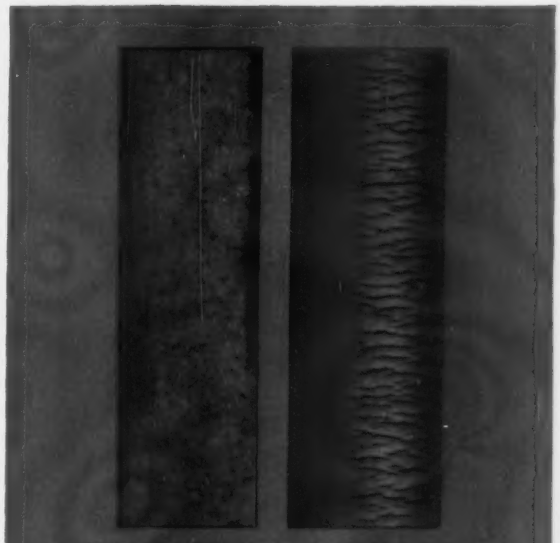
How long and how well antiozonants will work for you depends on the potency of the antiozonant and the various factors involved in compounding. One may give satisfactory protection under static conditions but fail under flexing. Another will provide mediocre protection in either static or dynamic service. UOP 88 and 288, however, provide excellent, tried and proven ozone protection to rubber goods in storage and in use.

At Universal Oil Products Company research scientists and technicians work constantly, testing and improving the UOP family of antiozonants.

What influences effectiveness

Effectiveness of antiozonant compounds may be influenced by these major factors:

1. Type of polymer, natural or synthetic.
2. Curing system.
3. Reinforcing agent.
4. Concentration of compounding ingredients, including the UOP antiozonant.
5. Conditions of use, including type of stress, ozone concentration, temperatures.



Rubber Strip Tests Show Effectiveness of UOP Antiozonants
The two rubber strips above were inserted in an ozone cabinet under identical, controlled conditions. The rubber in the sample shown on the right did not contain an antiozonant and reveals marked ozone damage. The SBR sample on the left contains two parts phr of a UOP antiozonant and reveals no ozone cracking after equal exposure.

The concentration level of the UOP antiozonant must be related to other ingredients in the compounding recipe and to exposure conditions. Variations in type or concentration of ingredients reduce or enhance the final, lasting effectiveness of the antizonant.

About your product . . .

For one penny per pound of base stock of your product, UOP 88 or 288 antiozonants will provide years of ozone protection, prevent ozone cracking even under severe atmospheric exposure. UOP facilities and technical personnel are at your disposal for counseling on your particular antiozonant needs. Just phone, write or wire our Products Department.

Exaggerated conditions of stress and ozone concentration in the oven assure complete protection under any normal conditions.

In the Universal rubber laboratory, a rubber mill is used to incorporate experimental UOP antiozonants in various rubber polymers.

Every day we test a number of rubber recipes. The Scott Tester is used to measure physical properties of an experimental vulcanizate.

UOP 88® and 288®

RUBBER ANTIOZONANTS

UNIVERSAL OIL PRODUCTS COMPANY

30 Algonquin Road, Des Plaines, Illinois, U. S. A.

Check the PROFIT POINTS of DAY

Gearless PONY MIXERS

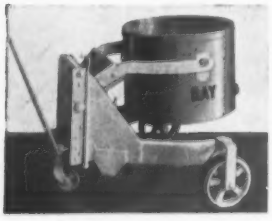
1. FAST, UNIFORM BLENDING of all ingredients being mixed. Agitator action insures against "dead spots" and stratification of materials—whether dry mixes, pastes or high viscosity liquids.

2. RUGGED, RIGID, TROUBLE-FREE construction makes DAY the standard of dependability. One piece cast frame assures absolute rigidity. Geared head motor drives agitators and can through roller chain and sprocket.

3. GUARANTEED PRODUCT PROTECTION from grease and oil. No bearings or stuffing boxes in the product zone.

4. QUICK, EASY REMOVAL OF AGITATORS from the batch. Counterbalanced head tilts easily by handwheel. Power tilting optional.

5. A MODEL FOR EVERY NEED with single motion or twin motion mixing action, one or two speed motors, in working capacities from 3 to 125 gals.



For full details, call in the Day field engineer in your area or write for Bulletin No. 500.

Mixer shown above, top, is Day Twin Motion Pony Mixer, having twin spindles with counter-rotating, overlapping blades. Shown immediately below is Day Single Motion Mixer. Day hydraulic lift trucks, left, and extra interchangeable cans, will further speed your production.

The J. H. DAY Co.

Division of The Cleveland Automatic Machine Co.

QUALITY MIXING, BLENDING, MILLING AND SIFTING MACHINES SINCE 1887

4918 Beech Street, Cincinnati 12, Ohio

News in Brief

► The Tire Accessories and Repair Materials Committee of the Rubber Manufacturers Association, 444 Madison Ave., New York 22, N. Y., has published a series of seven bulletins which explain and illustrate the reasons for particular types of premature failures in retreaded tires.

► How equipment operators and owners can get maximum service out of off-the-road tires is described in a new 52-page handbook published by the B. F. Goodrich Tire Co., Akron, Ohio.

► A 1958 catalog listing more than 500 monomers and polymers for research including new cross-linking agents, monomers for polyelectrolytes and substituted ethylenimines, has been released by the Monomer-Polymer Laboratories of the Borden Chemical Co., 5000 Langdon St., Philadelphia 24, Pa.

► Report BL-336, prepared by the Elastomer Chemicals Department of E. I. du Pont de Neumours & Co., Inc., Wilmington, Del., suggests a neoprene solvent cement containing an organic isocyanate as the active bonding and curing agent for joining cured Hypalon-coated fabrics. The report is entitled "A Seam Adhesive for Hypalon Coated Fabrics".

► A new, illustrated six-page folder describing its complete line of mechanical force gauges has been issued by W. C. Dillon & Co., Inc., 14620 Keswick St., Van Nuys, Calif., manufacturer of scientific testing instruments.

► A study of viscosity of plastisols entitled "Effects of Shear Rates, Temperature and Time on the Viscosity of Plastisols", and prepared by Todd C. Walker, has been published by the Firestone Plastics Co., Pottstown, Penna.

► Fife Manufacturing Co., Inc., has moved into a new plant located at 201 N. E. 48th St., Oklahoma City, Okla. The company will retain its mailing address, P. O. Box 878, but has acquired a new telephone number, Jackson 5-6623.

► Bulletin 100-4B, January 1958, released by the Thiokol Chemical Corp., 780 N. Clinton Ave., Trenton, N. J., compares the effectiveness of several dimethylol phenol resins as vulcanizing agents for butyl rubber.

► The 1958 Dow Corning Reference Guide, said to be the largest and most complete silicone catalog ever published, describes over 150 commercially available silicone products manufactured by the Dow Corning Corp., Midland, Mich.

Temperature extremes—which can rob vinyls of flexibility—are of little concern to producers who specify Plastolein low temperature plasticizers for their products. For example . . .

They know that Plastolein 9058 DOZ is the time-tested standard of the low temperature plasticizer field . . . that it provides the kind of low temperature flexibility *that stays in* their vinyls even after prolonged exposure to summer heat.

And more and more producers are utilizing the unusual capabilities of another Emery plasticizer, Plastolein 9078 LT, which approximates 9058 performance, but at a much lower price.

Why don't *you* investigate the advantage of these Plastolein Plasticizers in your coated fabrics, film, sheeting and extrusions?

Write Dept. U-11 for literature.

Emery

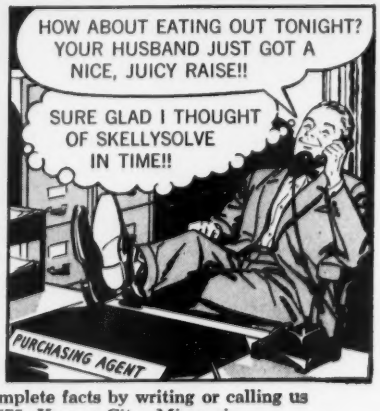
Plastolein® plasticizers

Organic Chemical Sales Department

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio

THE CASE OF THE
Strategic Switch
...AND UNLESS YOU CAN BEAT THIS PRODUCTION PROBLEM, WE'LL HAVE TO CANCEL YOUR CONTRACT!!
LATE SOLVENT SHIPMENTS ARE SLOWING US DOWN, BUT I'LL FIND THE ANSWER...OR A NEW PURCHASING AGENT!!

...AND HERE'S WHY YOU CAN QUIT WORRYING ABOUT LATE DELIVERIES WHEN YOU SWITCH TO SKELLYSOLVE!!
1. Orders phoned direct to Skellysolve plant.
2. 9 out of 10 cars shipped next day.
3. Shipping information sent promptly.
4. Skellysolve is quality-checked during production and before shipping.
5. Technical service backed by 25 years of Skelly experience.


HOW ABOUT EATING OUT TONIGHT? YOUR HUSBAND JUST GOT A NICE, JUICY RAISE!!
SURE GLAD I THOUGHT OF SKELLYSOLVE IN TIME!!
PURCHASING AGENT

Many companies in your industry depend on Skellysolve for exacting quality, prompt shipment, and expert technical service. Get more complete facts by writing or calling us today at LOgan 1-3575, Kansas City, Missouri.

Skellysolve for Rubber and Related Industries

SKELLYSOLVE-B. For making quick-setting cements for the shoe, tape, container, tire and other industries. Quick-drying, with no foreign taste or odor in dried compound. Closed cup flash point about −25°F.

SKELLYSOLVE-C. For making quick-setting cements with a somewhat slower drying rate than those compounded with Skellysolve-B. Closed cup flash point about 13°F.

SKELLYSOLVE-H. For general use in manufacturing operations and cements, where faster evaporation rate than that of Skellysolve-C is desired. Closed cup flash point about −16°F.

SKELLYSOLVE-L. For general manufacturing operations where a medium evaporation rate is required. Closed cup flash point about 12°F.

SKELLYSOLVE-R. For general use in tire building and a variety of other manufacturing operations and cements. Reduces evaporation losses. Medium quick final dry. Lessens bloating and skinning tendency. Closed cup flash point about −25°F.

Ask about our new Skelly Petroleum Insoluble Grease.

SKELLY **Skellysolve**

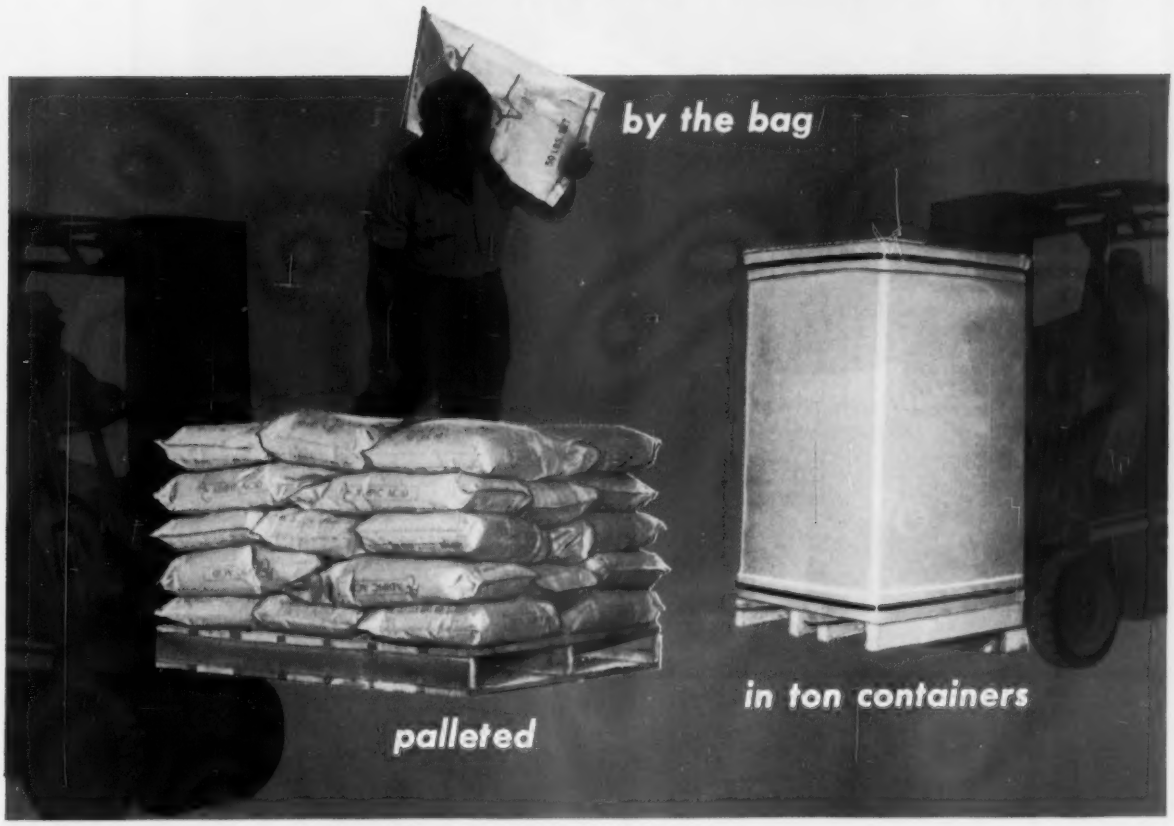
SKELLY OIL COMPANY

Industrial Division

605 West 47th St., Kansas City 41, Mo.

how do you want your

National® ADIPIC ACID?



Any way you want it, you're sure of exceptional service from National Aniline . . . by truck or rail from our Hopewell, Virginia plant and from ample branch office warehouse stocks.

Production by our direct, continuous process is completely integrated within the Allied Chemical group. Quality is unsurpassed . . . 99.8% minimum purity, light in color and low in moisture, iron and volatile acids.

Adipic acid has broad application in the manufacture of plasticizers (particularly for low temperature use), polyester resins for urethane foams, synthetic lubricants, fibers, elastomers, alkyd resins, etc. It shows excellent promise in a variety of other uses as well.

If you use adipic acid or have a potential interest in it, we will be glad to send you a sample and copy of our newly revised Technical Bulletin I-12R.

Allied Chemical

NATIONAL ANILINE DIVISION

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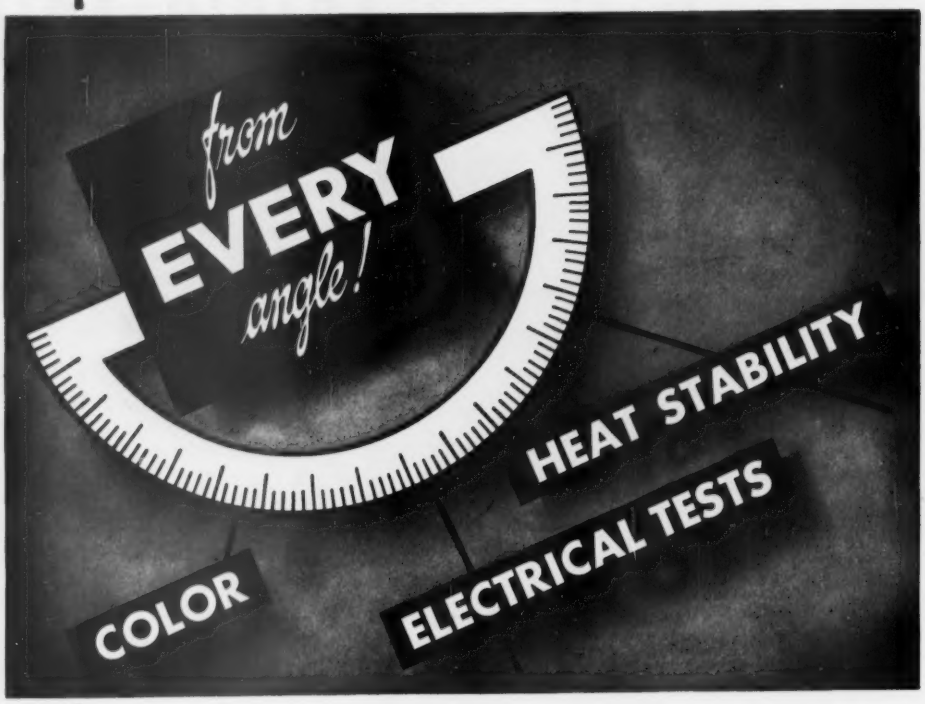

PIGMENT NO. 33

for Compounding

VINYLS AND SYNTHETIC RUBBER

Sample and technical data sent promptly on request

SOUTHERN CLAYS, Inc.

33 RECTOR STREET
NEW YORK 6, N. Y.

THE YEAR IS 1893

Charles Edgar Duryea's second automobile has a special place in history for two reasons. It was the first car to be called a "horseless carriage": and it was the first car to have pneumatic tires. Introduced in 1893, the Duryea soon became the first car produced in quantity.

Many motorists recall the necessity for carrying extra casings, inner tubes, rubber cement and vulcanizing outfits, along with the jack and pump furnished as standard equipment by the manufacturer. The pneumatic tire had a long way to go.

A dramatic advance in the development of the rubber tire came with the introduction of carbon black in rubber compounding. A short life-span was thereby amazingly increased; their dependability soon was to make jacks and pumps virtually obsolete.

Through constant research and cooperation with the rubber industry, United Carbon Company, Inc., has been a constructive force and important contributor to its advances of the past 30 years. United Blacks have become a standard of excellence for the industry.

UNITED CARBON COMPANY, INC.

What's that — no problems or complaints on Dixie 60 HAF black? That's right!

You have no problems when Dixie 60 is your standard because it is a super quality black made from specially selected feedstocks by a well-proven process. To be sure, the black is control checked at all times.

You'll have no doubts about Dixie 60 quality because the black is exceptionally well designed to process to your liking and to reinforce as an accepted HAF black should.

There should be no occasion for complaints on Dixie 60: the black is of high quality to begin with and is extremely uniform. It also contributes to the best service performance no matter how severe the conditions.

Standardize on UNITED blacks. They have what it takes to put your products across.

UNITED CARBON COMPANY, INC.

A subsidiary of United Carbon Company

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IN CANADA: CANADIAN INDUSTRIES LIMITED

Will your products look old before they're sold?

not if you use VELSICOL X-37 Hydrocarbon Resin!

VELSICOL'S X-37 RESIN used in white or light colored rubber products maintains resistance to ultra violet discoloration. Recipes that contain X-37 keep their light, fresh, appealing colors. On the shelf, on display, and in use, they retain color character that appeals to consumers and keeps them coming back for more! X-37 also increases flex, and you can use it in shoe soles, household products, light colored flooring tile, and many other rubber compounds. Get the facts now, without cost or obligation!

LOOK FOR THIS MAN

... your Velsicol representative who can help you make better products for less!

MAIL THIS COUPON TODAY FOR TECHNICAL INFORMATION AND TEST SAMPLES

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International Representative:
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P. O. Box 1687 • Nassau, Bahamas, B.W.I.

VELSICOL CHEMICAL CORPORATION RA-118
330 East Grand Avenue, Chicago 11, Illinois

- ☐ Please have a salesman call to discuss Velsicol X-37 resins.
- ☐ Please send a sample for pilot plant use.
- ☐ Please send technical literature.

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Company_____

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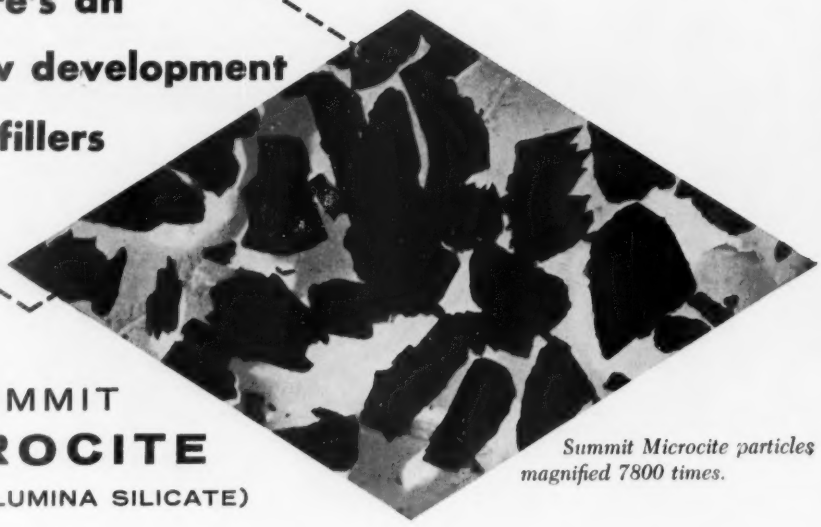
Here's an exciting new development in fillers



Summit Microcite particles magnified 7800 times.

SUMMIT MICROCITE
(HYDROUS ALUMINA SILICATE)

Here is Summit's revolutionary answer to an industry need . . . a top quality *micronized* filler material that will meet and outperform currently available products. Produced and tested under rigid quality control methods and *job-proved* in the field, Summit MICROCITE is ready to go to work for you . . . now!

By origin, Summit MICROCITE is a hydrous alumina silica, double air classified and processed to a *controlled* low particle size and high surface area. It is chemically inert and essentially neutral with a pH of 6.8. MICROCITE is free flowing . . . will not absorb moisture either in transit or in storage (moisture-controlled to ½ of 1%).

Here are some of the many reasons why it is best for you: *very low* mill shrinkage, not conducive to heat build up, good cured properties, high tensile strength, less die swell . . . mixes fast and easily . . . and is not scorchy.

Like to know *more* about how Summit MICROCITE can make *your* product better? Write today for a copy of Bulletin 1257 and Technical Data Sheets 100-1-2-3. There's no obligation, of course.

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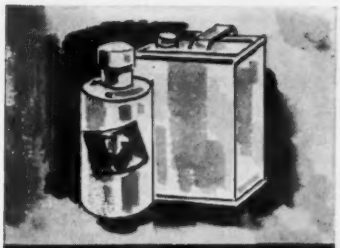
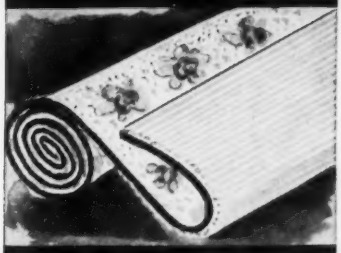
SUMMIT MINING CORPORATION CARLISLE, PENNSYLVANIA

THE SUMMIT OF QUALITY

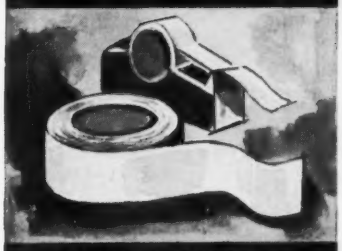


IN WAX EMULSIONS!

LATEX GOODS!



RUG BACKINGS!



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- **EXTRA TOUGHNESS**
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More and more manufacturers in various fields are turning to MARMIX for the essential qualities that make end-products more appealing, more practical. In *wax emulsions*, MARMIX contributes to increased film hardness and adhesion. When MARMIX is used in dipped *latex goods* your product has increased tear resistance, hardness and tensile strength; while in foamed latex goods, MARMIX offers improved dimensional stability plus such benefits as reduced shrinkage and a higher compression modulus. MARMIX also protects *rug backings* against warping or curling effects, and allows for higher pigment loading. *Paper products* employing MARMIX as a saturant or additive offer such important benefits as extra resistance to tear and delaminations, as well as greater protection against moisture, grease, oil and chemicals.

To assure a better product, and at lower cost —specify MARMIX.

Get the facts . . . **WRITE TODAY FOR FULL DETAILS AND SAMPLES**

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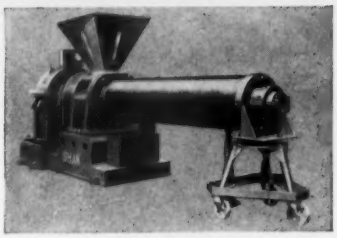
quality engineering puts efficiency into Shaw machines

The cost-cutting performance of every Francis Shaw machine and its thorough dependability are the result of long experience and unvarying high standards of engineering in every detail of manufacture.

Close-limit accuracy and rigorous inspection during manufacture guarantee to the user a consistently high quality output from Francis Shaw equipment.



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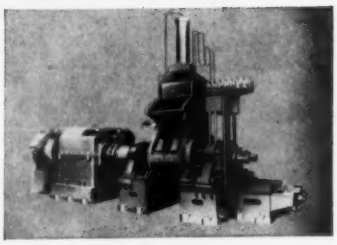
Extruder sizes from 1" to 12".

CALENDER. A comprehensive range of Francis Shaw Calenders is available for the processing of all rubber and plastic materials. Flood Lubrication and hydraulic roll balancing available on all production sizes. Roll Bending can be fitted as an additional refinement. All sizes available from 13" x 6" to 92" x 32". Two-, Three- and Four-Bowl Designs.



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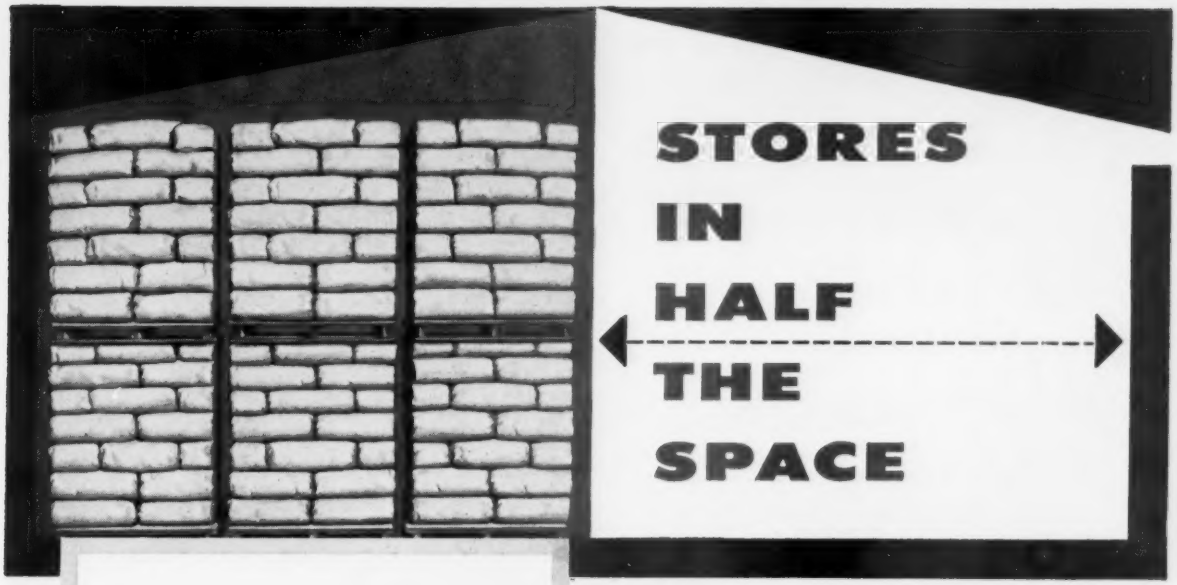
P.1160

AZODOX

New, Higher Density Zinc Oxide



HERE ARE OTHER IMPORTANT REASONS WHY AZODOX IS BEST FOR YOU

Increased Mixing Capacity. AZODOX incorporates readily, disperses completely in both hard and soft stocks, at high or low concentrations, on the mill or in the Banbury. No hard-crusted agglomerates are present in AZODOX to cause mixing and dispersion difficulties.

Physical Properties Unchanged Except for Density. Surface area, particle size and shape, color and all other physical properties of AZO-ZZZ, American Process, zinc oxides are unaltered. *Apparent density only is changed.* All chemical properties are unchanged.

Flows More Freely, Less Dusting than conventional zinc oxides.

AZODOX Cuts Your Costs. Faster handling, easier storing, quicker mixing save you money.

AZODOX is factory-tested and proved. Now available in sample lots or carload quantities for your use *at the same price of conventional zinc oxides.*

AZODOX available in surface treated form if desired.

AZODOX is a revolutionary new form of zinc oxide (de-aerated). With twice the density, half the bulk of conventional zinc oxides, AZODOX is the answer to your storage problem. AZODOX comes to you in an easy-to-handle small package, shaped to permit closely packed, unitized shipments. *And the perfect texture of the material remains unchanged.*

AZODOX is available in all grades of American process lead-free zinc oxide.

American Zinc sales company

Distributors for
AMERICAN ZINC, LEAD & SMELTING COMPANY

STRENGTH... that's what FORTISAN-36 assures FIRESTONE auto hoses

Firestone uses Fortisan-36 to shape 21 different radiator hoses. This remarkable reinforcement yarn with high tensile strength and excellent stability gives you improved performance with less weight.

Firestone finds Fortisan-36's excellent stability lets you form and cure hose *easily* to any shape. You get longer life and excellent flexibility. Ask Firestone about this proved performer. See how performance-tested Fortisan-36 rayon takes the woes out of hose.

Celanese Corporation of America, Sales Development Department, Textile Division, Charlotte, North Carolina. Celanese® Fortisan®

DISTRICT SALES OFFICES: 180 Madison Ave., New York 16, N. Y. Room 10-141 Merchandise Mart, Chicago 54, Illinois. P. O. Box 1414, Charlotte 1, N. C.: 200 Boylston St., Chestnut Hill 67, Mass., 819 Santee St., Los Angeles, Calif.

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Fortisan-36 . . . a Celanese industrial fiber

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There's ready wetting and easy dispersion in store for users of UNITANE O-220. High opacity and clear color tone are the result . . . an *economical* result because of the unsurpassed whitening power of this titanium dioxide pigment.

Production people will appreciate the freedom from agglomeration . . . the non-reactivity with rubber chemicals . . . the minimum loading requirements. The *only* effect of UNITANE O-220 in rubber compounding is the production of top-quality whites and pastels.

Full information and samples will be gladly furnished by your Cyanamid Pigments representative.

. . . because

UNITANE® O-220
TITANIUM DIOXIDE
is made to give rubber its ultimate in whiteness

CYANAMID

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WHITER AND BRIGHTER WITH UNITANE

MR. CLIMCO SAYS...

Climco Liners last longer because of their non-sticking quality, increased tensile strength and lasting flexibility.

In addition to reducing fabric purchases, Climco Liners also cut production costs — because they separate perfectly from the stock, down-time due to stock adhesions is eliminated. Tackiness of the stock is preserved, gauges are more easily maintained and latitude in compounding is enlarged. There is no lint or ravelings with Climco Liners and they can be stored horizontally if desired.

Since 1922 Climco Processed Liners have proved their worth to the rubber industry. Give them a trial in your plant.

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Tells all about Climco Liners and Linerette and how to get better service from liners. Write for your copy now.

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Treatment Contains
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CLIMCO
PROCESSED LINERS
Serving the Industry Since 1921

. . . and for personal attention to your synthetic rubber orders . . . I'd suggest ASRC!

ASRC offers you highest quality synthetic rubber . . . efficient service that is timed to your needs . . . personal attention to your orders . . . prompt shipments. You will find it pays to rely on ASRC for *quality* products and *quality* service!

CURRENT POLYMERS

COLD	CLASS	HOT	CLASS
ASRC 1500	Staining	ASRC 1004	Staining
ASRC 1502	Non-Staining	ASRC 1006	Non-Staining
ASRC 1503	Non-Staining	ASRC 1009	Non-Staining
ASRC 3105	Non-Staining	ASRC 1018	Non-Staining
ASRC 3110	Non-Staining	ASRC 1019	Non-Staining

COLD OIL

ASRC 1703	Non-Staining
ASRC 1708	Non-Staining

ASRC

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rubber substitutes

Types, grades and blends
for every purpose, wherever
Vulcanized Vegetable Oils
can be used in production
of Rubber Goods—
be they Synthetic, Natural,
or Reclaimed.

A long established and proven product.

THE CARTER BELL MFG. CO.
SPRINGFIELD, NEW JERSEY

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HARWICK STANDARD CHEMICAL CO.
Akron, Boston, Chicago, Los Angeles, Trenton, Denver,
Albertville, (Ala.), Greenville, (S. C.)

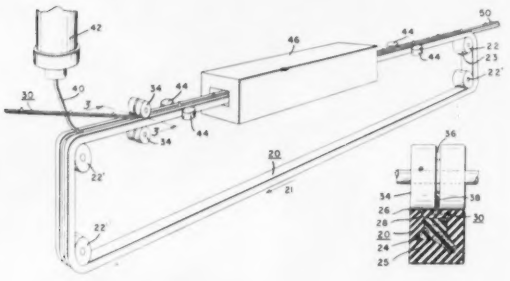
PATENT REVIEW

by Melvin Nord

Molding Rubber Foam Latex Strips

U. S. Patent 2,835,924, issued May 27, 1958, to William H. Schmeling, assigned to General Motors Corp., describes a method for making rubber foam latex strips.

As seen in the diagram, which shows a molding apparatus and a view of the molding cavity, the numeral 20 designates an endless flexible mold part, made from elastomeric material, that is continuously moved in the direction of the arrow (21) and maintained under a suitable tension as it passes over rollers (22 and 22′) by driving means not shown. The mold part (20)



has a continuously extending cavity (24) exposed to a surface (26) by an opening (28) that has inclined sides so that a preformed portion of a strip or cork (30) may be tightly and correctly positioned in it to form a closed mold cavity (25). The specific form of the strip subsequently formed in the mold cavity may be of any desired shape. The form illustrated shows a cross-sectional shape designed to mold an automobile door sealing strip.

A filling nozzle (40) leading from a supply chamber (42) extends into the open mold cavity (24) before it has been closed by the strip (30) and extends a suitable distance into the mold cavity (25) after it has been closed so the flowable material from the chamber (42) may be longitudinally injected into the mold cavity through a nozzle tip, not shown, at substantially atmospheric pressure and be directed to the central portion of the cross-section of mold cavity in the direction of travel of the mold part (20) and the preformed corking strip (30). The two pressure rollers (34) are located in a plane normal to the travel of the closed mold to tightly force the strip (30) into the opening (28) to minimize the escape of molding material around the edges of the corking strip (30).

A number of suitably located rollers (44)

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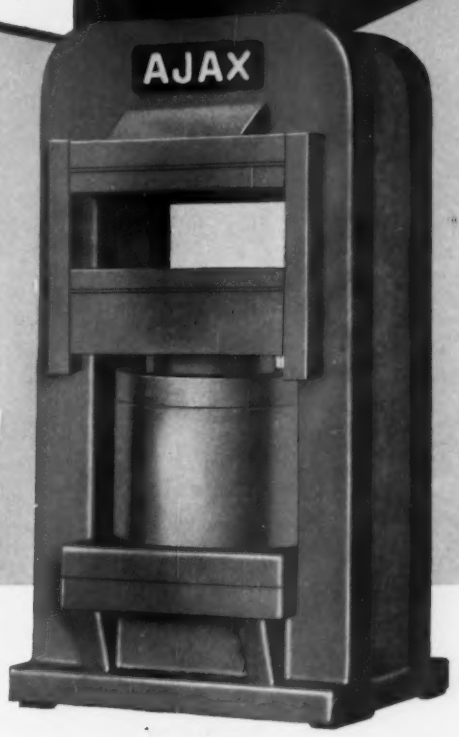

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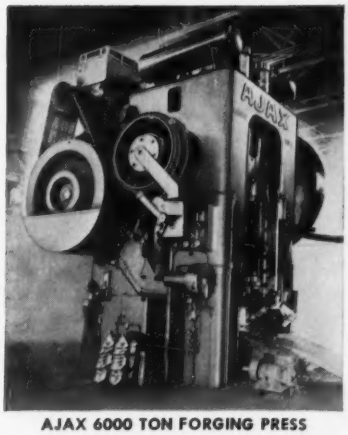

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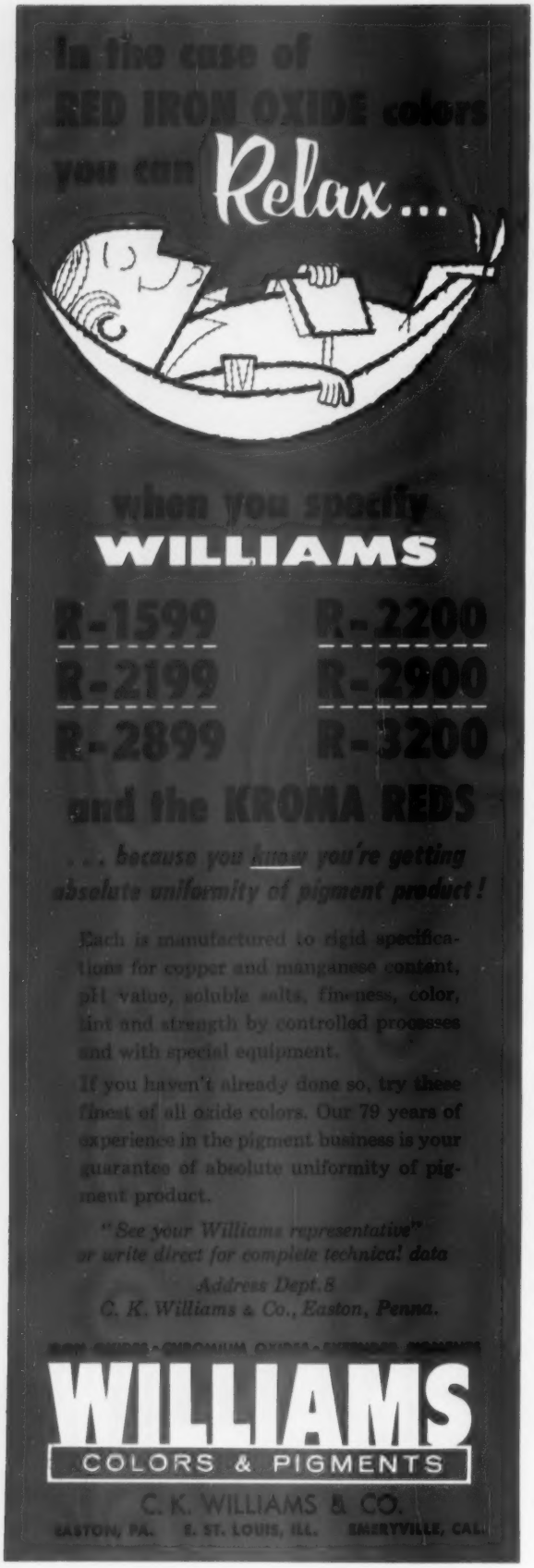
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axially align the parts defining the closed mold cavity at the entrance and exit ends of the heating apparatus (46), so that the mold cavity is in correct axial alignment as it passes through the heating chamber.

It is apparent that if the mold part (20) is of elastomeric material, the strip molded in the mold cavity must not adhere to the surface portions of the mold cavity when the material is being formed and bonded to the preformed portion of the strip. This can be readily accomplished by suitably coating the mold with a suitable mold lubricant.

The roller (22) is curved to flex the elastomeric material of the mold part (20) and thereby facilitate the continuous removal of the finished strip (50) as it passes from the mold cavity.

Vulcanization of Butyl Rubber

U.S. Patent 2,830,970, issued April 15, 1958 to Pliny O. Tawney, assigned to United States Rubber Co., describes a new method of vulcanizing butyl rubber. According to the invention, butyl rubber is vulcanized by heating with a 2, 6-di (acyloxymethyl) - 4 - hydrocarbylphenol and a heavy metal halide. The cure is carried out at temperatures of 150 to 190°C. The resulting vulcanizates are said to have remarkable resistance to oxidation and to exposure at elevated temperatures.

Agglomeration of Compounding Ingredients

U. S. Patent 2,834,991, issued May 20, 1958, to Albert F. Hardman and assigned to Goodyear Tire & Rubber Co., describes a method for compounding ingredients for rubber so as to eliminate certain health hazards and handling problems in the use of finely powdered ingredients.

Because of the required use of finely powdered organic ingredients in the compounding of natural and synthetic rubber, certain problems develop for the rubber goods manufacturer. For example, in normal production operations, there may be a substantial loss of particles which are light enough to be blown into the surrounding air. Such losses, due to the high price of many of the materials involved, represent a substantial increase in cost of production. In addition, the presence of these tiny dust particles in the air surrounding production operations results in the contamination of other materials.

Certain of the powders used in the compounding of natural and synthetic rubbers create serious health hazards because of their tendency to be blown into the surrounding air, causing irritation

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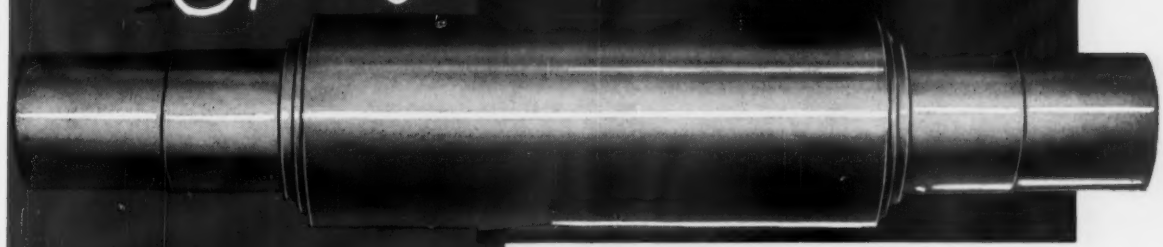

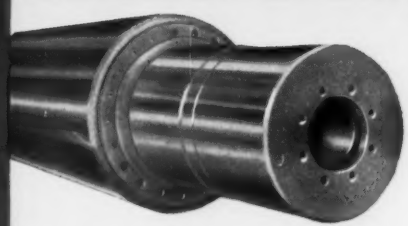

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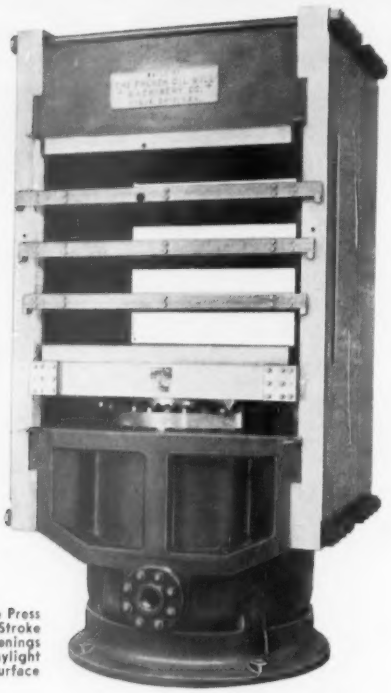

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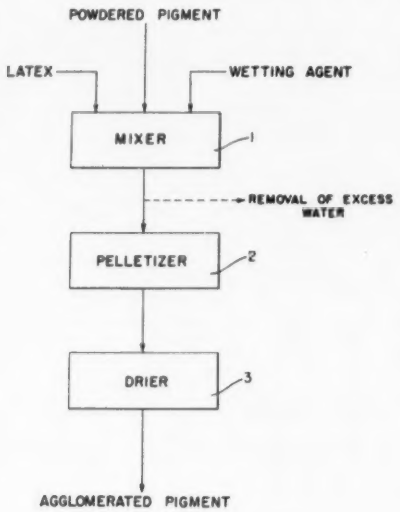
to the mucous membranes in the mouths and nasal passages of the workmen who must breathe the contaminated air. The class of ingredients known as organic accelerators are particularly objectionable in this respect.

In the present invention, these ingredients are prepared in an agglomerated form, thus eliminating these problems. It has been found that the agglomerates of the powdered material can be prepared by mixing it with a binder for the individual particles and a wetting agent. This binder is compatible with the rubber in which



the compounding ingredient is to be used, as is the wetting agent which causes the particles to be coated by the binder and, in some cases, will prevent the generation of objectionable static electrical charges on the finished product. The mixing operation can be carried out in aqueous suspension, the consistency of which can vary from that of a thick paste to an aqueous slurry. After thorough mixing, as by stirring, any excess water is removed by filtration and drying until the water content is between about 20 to 40 per cent by weight of the total mixture. In this form, the mixture can be shaped in any kind of pellet-forming apparatus, such as a molding press, corrugated rolls or an extrusion mill. The process is shown schematically in the accompanying diagram.

The purpose of the binder is to hold the individual particles of powder together in an agglomerate. It has been found that by mixing the accelerators with about 1 to 10 per cent of their weight (based on dry rubber content) of a rubber latex, including latices of any natural or syn-

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thetic rubber, firmly bonded pellets of the powder can be prepared which hold together during normal handling operations but which disperse readily into and through the rubber when the pellets are mixed with rubber during milling.

The wetting agent which is mixed with the powder and binder causes the individual powder particles to be coated by the binder. Certain wetting agents have the additional advantage of functioning as an inhibitor of static electrical charges which tend to form on the powdered particles during preparation. Examples of suitable wetting agents are any of the commercially available wetting agents such as those containing the alkali metal, ammonium, and amine salts of saturated or unsaturated fatty acids having from 12 to 24 carbon atoms.

Curable Polyurethane-Urea Elastomers

U. S. Patent 2,835,654, issued May 20, 1958, to Albert S. Carter and Maurice L. Ernsberger, assigned to E. I. du Pont de Nemours & Co., describes a process for the production of curable polyurethane-urea elastomers containing the residues of high molecular weight glycols.

The elastomers are formed by the reaction of high molecular weight bis-chloroformates, phosgene, and primary diamines. The resulting elastomeric product may be cured by heating with a diisocyanate.

Other Patents Of Interest

Subject	Inventor or Assignee	Patent No.	Date
Tank linings	Goodyear Tire & Rubber Co.	2,821,294	1/28/58
Method of drying latex-spun products	Dow Chemical Co.	2,821,459	1/28/58
Coating surface by spraying white-wall tire walls	Willi E. Hummel	2,821,487	1/28/58
Fire resistant composition of silicate, refractory and nitrile-type rubber	B. F. Goodrich Co.	2,821,514	1/28/58
Rubber glove with reinforced turn-back cuff	Surety Rubber Co.	2,821,718	2/4/58

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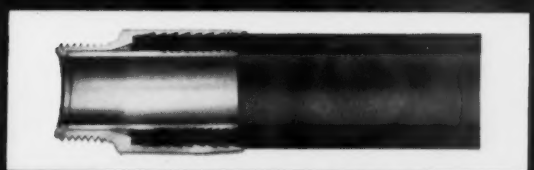

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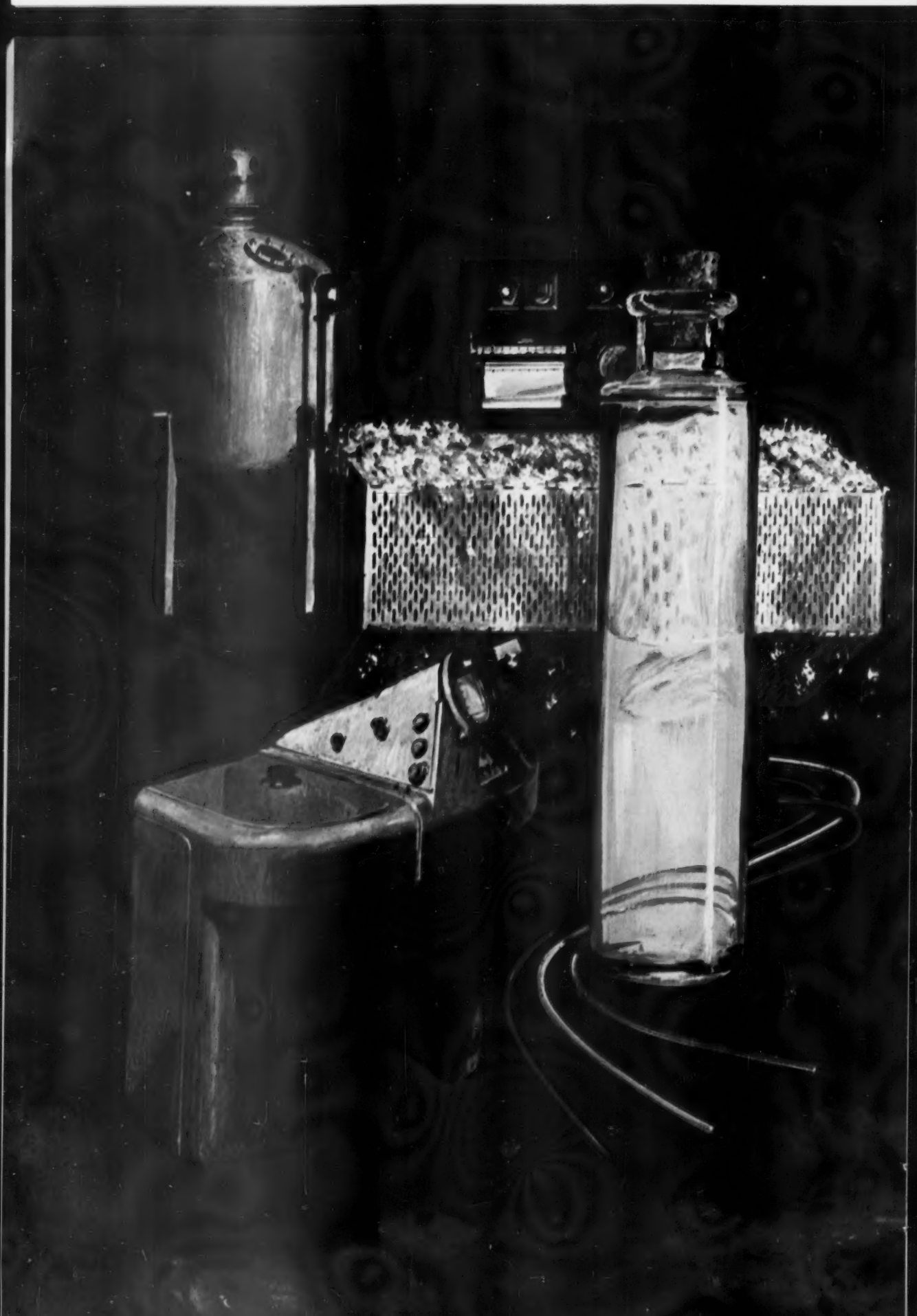

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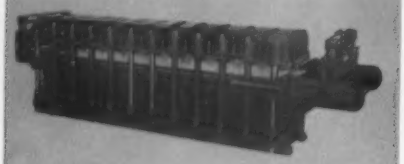

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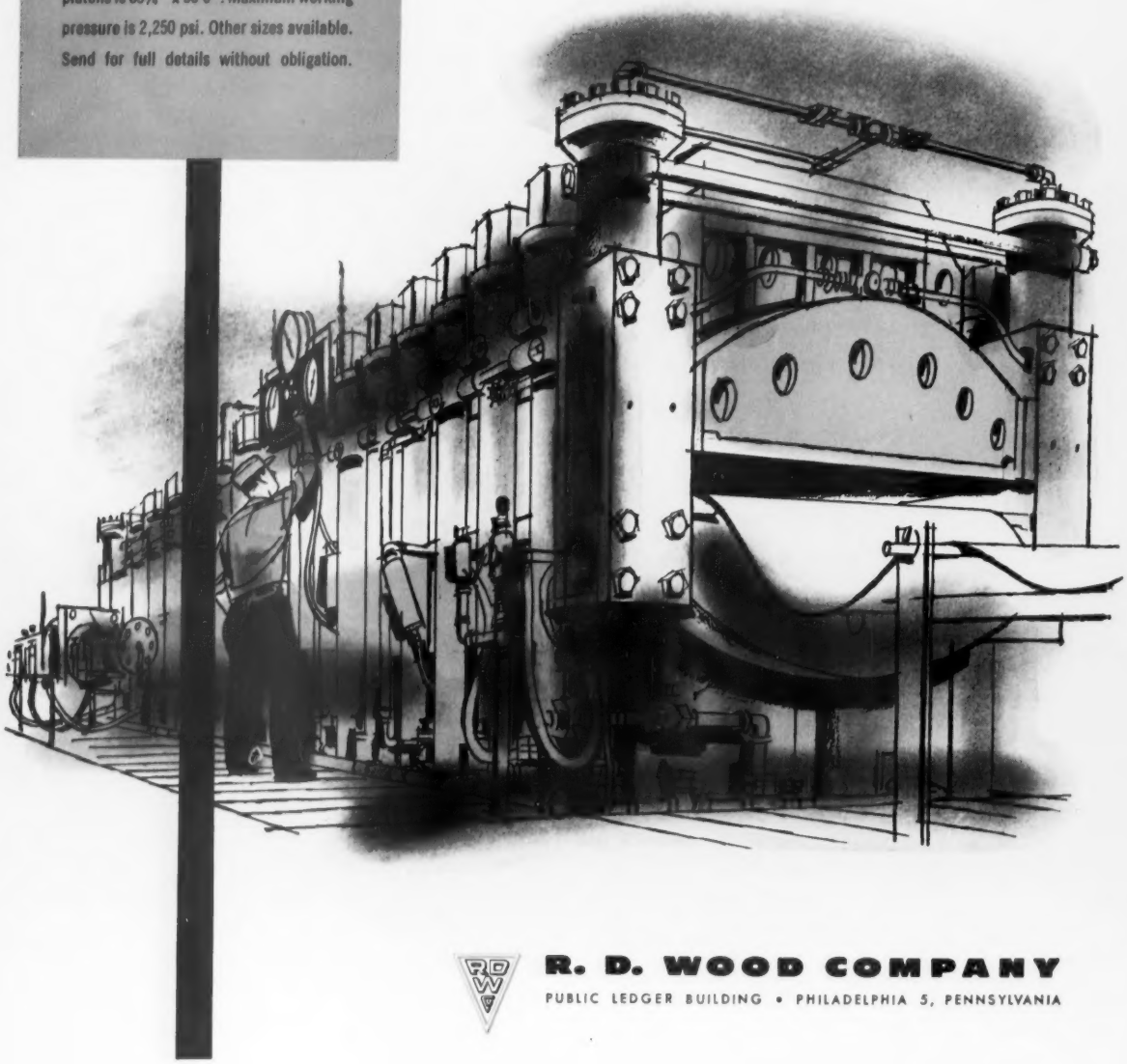

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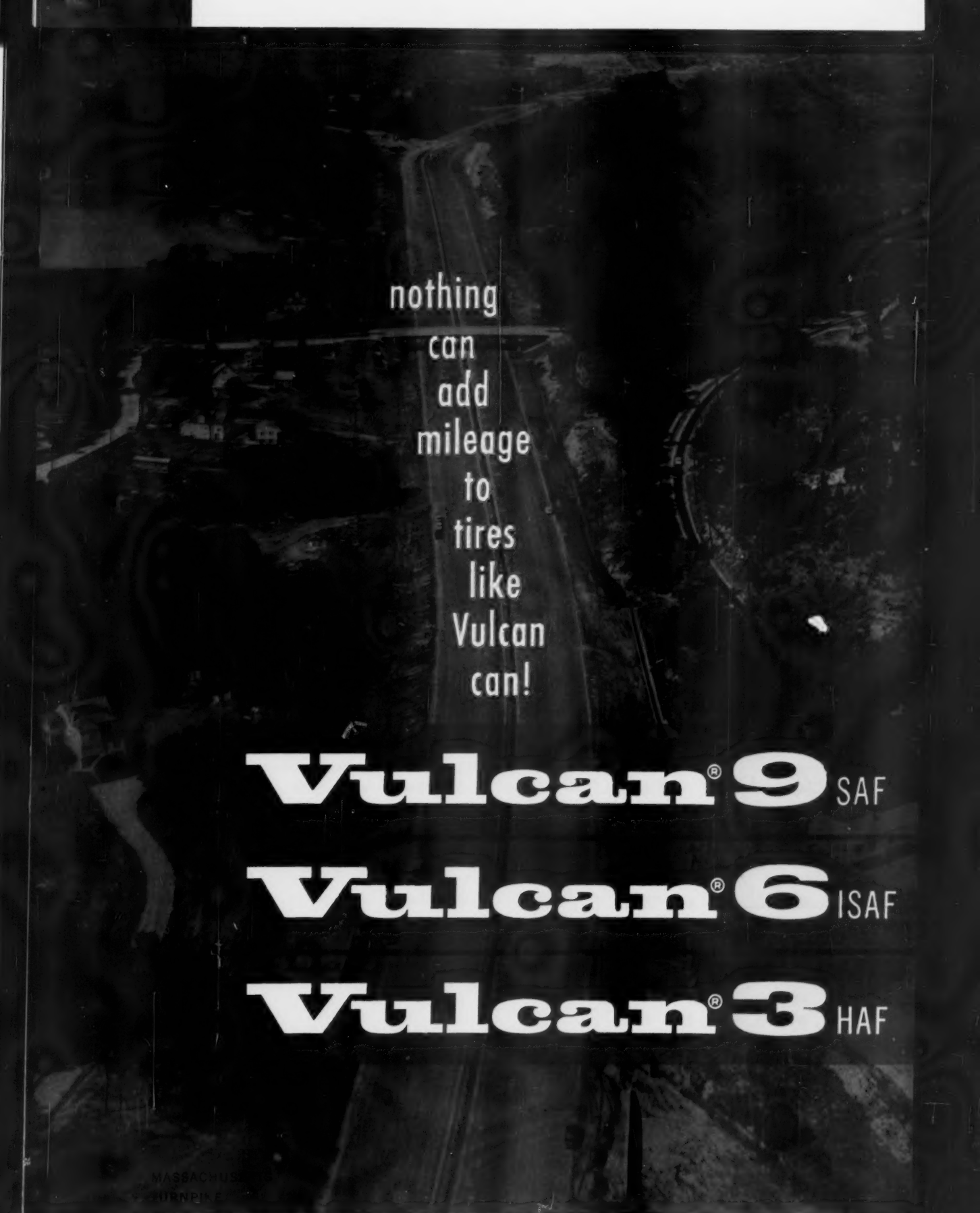

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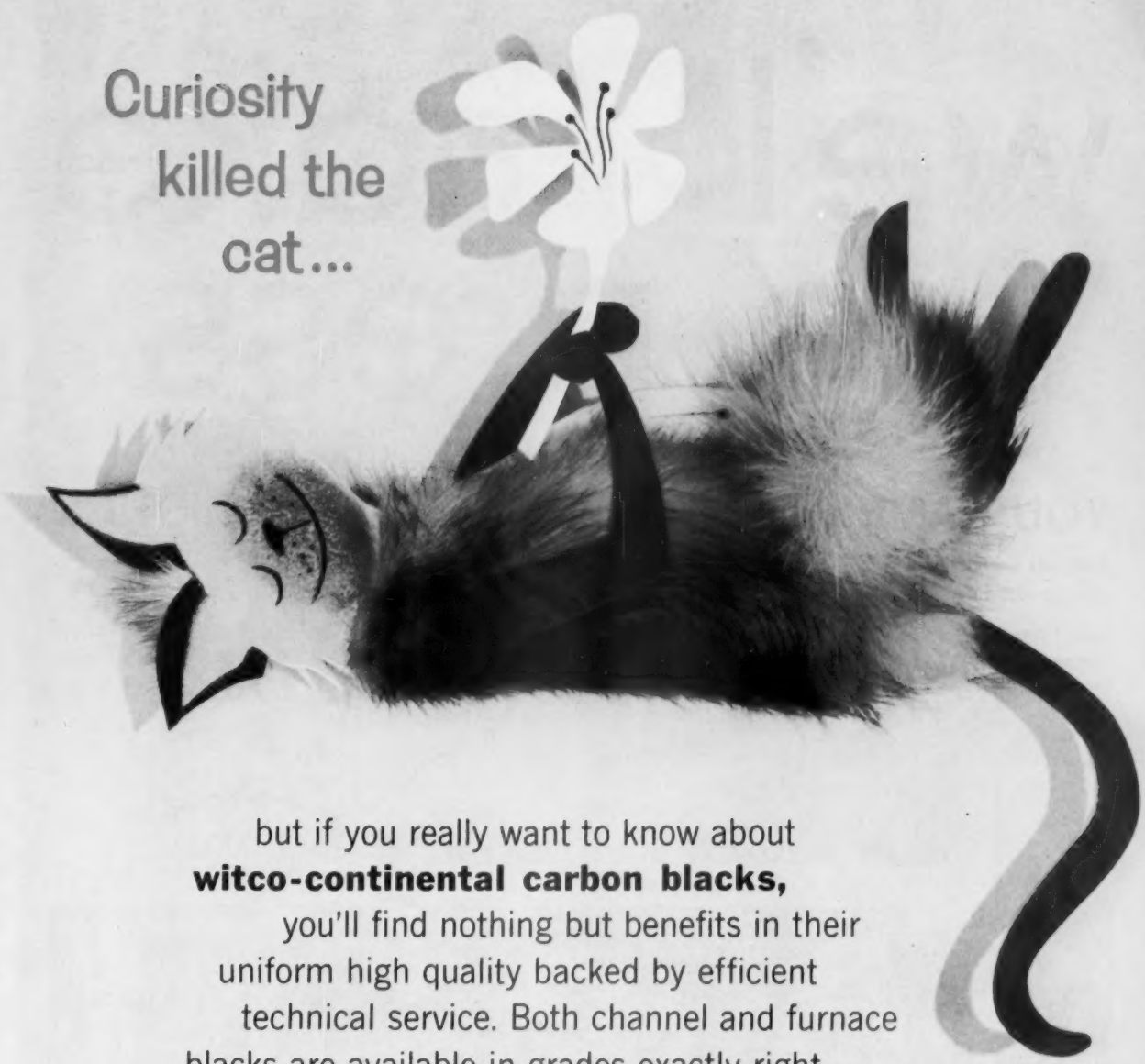

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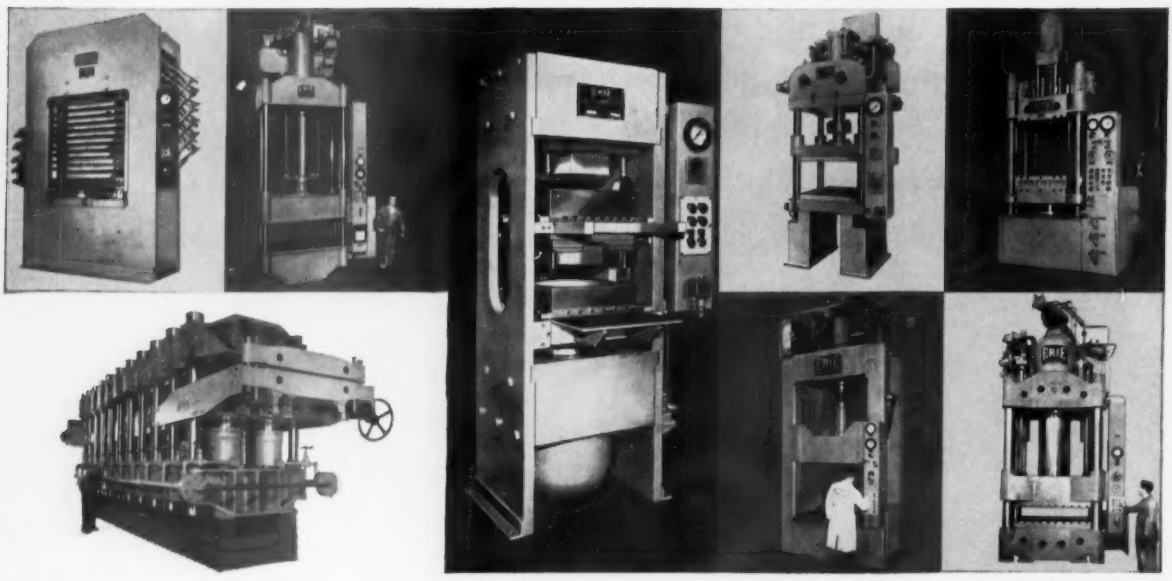

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Many manufacturers are finding that rubber tumbling with Pureco CO_2 saves money and produces a smoothly deflashed product.

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Contact your nearest Pure Carbonic office or write the address below.

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Overseas

Colombo—The Ceylon government plans to set up a factory for the production of motor-car tires and tubes as a State-owned enterprise. The project is part of technical cooperation agreements between Ceylon and the Soviet Union.

Bonn—The Gulf/French Atlantic Hamburg Range Freight Conference has equalized the different freight rates for shipment of certain goods from United States Gulf harbors to Rotterdam/Antwerp on one side and Hamburg/Bremen on the other. The previous surcharge of about 10 per cent on shipment of some goods, including synthetic rubber, to Hamburg or Bremen has been removed.

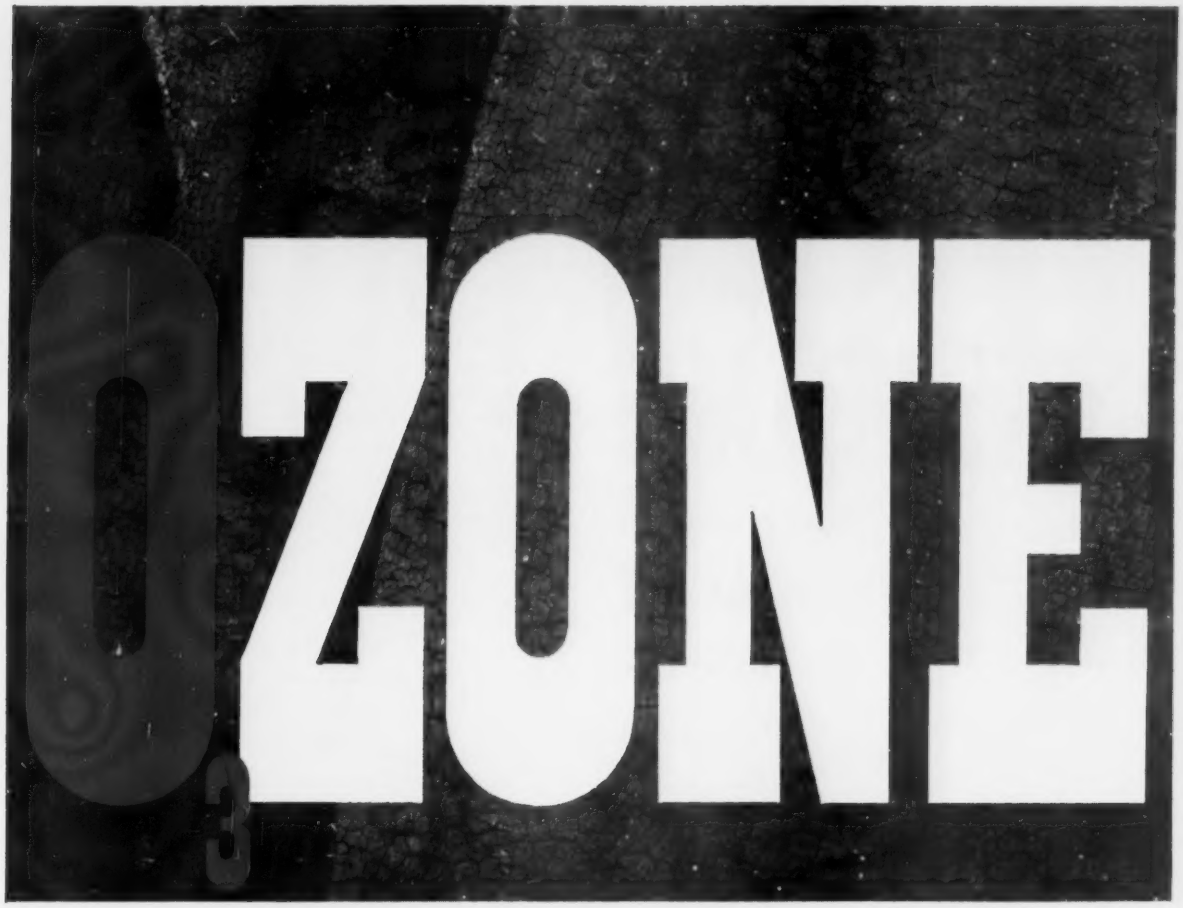
New Delhi—The change-over to the metric system of weights and measures has begun in India to replace the present method inherited from the British. This project is expected to take ten years to complete.

British East Africa—Imports of rubber tires and tubes into Kenya, Uganda and Tanganyika, in the first quarter of this year were down by £21,000 compared with the corresponding period last year. The value of these imports now stands at £867,000.

Ottawa—Submarine Cables, Ltd., owned jointly by Siemens Edison Swan, Ltd. and the Telegraph Construction and Maintenance Co., Ltd., has been awarded a $2½ million contract by the Canadian Overseas Telecommuncations Corp., to manufacture and establish a four hundred mile submarine telephone cable system between the mainland of Canada and Newfoundland. The system will be capable of carrying 120 two-way telephone circuits simultaneously over a single conductor.

Canberra—The Australian House of Representatives has passed proposals to reduce duties on imports of rubber and latex, effective October 2. A spokesman said the duties on rubber and rubber latex, whether natural or synthetic, would be reduced from 4d. to 2d. per pound. At the same time, a by-law item was passed which permits the duty-free entry of rubber and rubber latex if satisfactory arrangements have been made for the disposal of the Papuan (New Guinea) crop.

Kuala Lumpur—The Malayan Planting Industries Employers' Association and the National Union of Plantation Workers have met in Kuala Lumpur in a new attempt to reach a settlement of the nine-month-old wage dispute.



How to arrest its attack on rubber products

Ozone attack is now recognized as the major cause of cracking and checking in stressed rubber products.

The mechanism of this type of deterioration is attributed to the chemical attack of ozone upon the carbon-to-carbon double bonds of unsaturated elastomers. Through a rather complex reaction the double bond is broken. This places additional stress upon adjacent chains and increases their sensitivity to ozone attack. Thus a continuing reaction occurs, leading to the development of fissures perpendicular to the direction of the stress.

To combat the deteriorating effects of ozone, rubber chemists have several approaches open to them:

(1) Addition of waxes which migrate to surface areas

(2) Protection of surface areas with an inert coating

(3) Incorporation of antiozonants

Of these three methods, the use of antiozonants is the most effective for rubber products under stress. Antiozonants are easily incorporated into the rubber during processing and slowly exude to the surface during use. Because they interrupt the chain-breaking reaction between ozone and unsaturated elastomers, antiozonants provide a continuing protection which cannot be equalled by any physical method.

Eastman's Eastozone antiozonants protect rubber products more effectively at lower cost than do other types of commercially-used antiozonants. Using Eastozone antiozonants, compounders often can cut antiozonant requirements in half and still get the same ozone resistance, measured by static or dynamic exposure tests.

Give your mechanical goods or tire stocks maximum service life at minimum cost by incorporating Eastozone antiozonants in your rubber recipes. Ask your Eastman representative for samples and a copy of Bulletin 1-102 "*Eastozone Antiozonants for the Rubber Industry*" or write to EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENNESSEE.

Chemical Description of Eastman Antiozonants

Eastozone 30 ..... N, N'-Di-2-octyl-p-phenylenediamine
Eastozone 31 ..... N, N'-Di-3-(5-methylheptyl)-p-phenylenediamine

Eastozone Eastman Rubber Antiozonants

SALES OFFICES: Eastman Chemical Products, Inc., Kingsport, Tennessee; New York City; Framingham, Massachusetts; Cincinnati; Cleveland; Chicago; St. Louis; Houston. **West Coast: Wilson Meyer Co.,** San Francisco; Los Angeles; Portland; Salt Lake City; Seattle.

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OVERSEAS (CONT'D)

Madrid—Pirelli SA plans to build a rubber goods plant at Tarragona. To be set up with additional capital of 200 million pesetas, the new enterprise is scheduled to be completed in two years. The range of production may include foam rubber goods.

Oslo—A Norwegian firm, A/S Askim Gummivarefabrik, has signed a contract with the Bata Shoe Co. of Canada for the production, under license, of Bata plastic footwear. The machinery required to produce this line will be delivered from Canada this year.

Ghana—R. T. Briscoe (Ghana) Ltd., and the East Asiatic Co. of Copenhagen have established a 2,000 acre rubber plantation at Dixcove. The Ghana government has agreed in principle to participate. The first planting of 600 acres has been made with seedlings from Liberia.

Ankara—Imports of motor tires in Turkey have been running at only half the normal requirements, which has resulted in an acute shortage.

Sierra Leone—The Sierra Leone government is examining the possibility of starting a rubber plantation as it is believed that climatic conditions are favorable. Ministers from that country have recently visited Liberia to discuss the project.

Kuala Lumpur—Malayan estate workers are becoming more worried about the break-up of properties as 8,000 workers have already lost their jobs through the break-up of plantations in the past 18 months.

Hythe—A plant for the production of synthetic rubber, which is believed to be the world's most modern, has been opened in England. Built at a cost of $16,800,000, it was designed and installed by Americans. The new facility, Britain's first venture into the bulk manufacture of general purpose rubber, is expected to turn out 70,000 tons a year at full production.

Belgian Congo—A major increase in the production of rubber is expected to be among the objectives of the second Ten-Year Development Plan for the Belgian Congo. The area planted with rubber is about 200,000 acres, three-quarters of which is European owned. Rubber will be subject in the common market area to an average of the six national duties, but there will be exemption for Congo and French Colonial produce.

Bonn—Farbenfabriken Bayer has secured a $20 million medium-term loan from the United States banking consortium headed by J. P. Morgan & Co., New York, N. Y., to consolidate and expand its foreign interests held by Bayer Foreign Investments, Toronto.

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NAUGAWHITE is a liquid alkylated phenol which protects natural rubber, SBR and nitrile rubber against light, heat and oxygen degradation without discoloring the rubber or staining other materials by contact migration. It is especially useful in white sidewall tire carcass compounds, white sidewalls, light-colored footwear, molded sundries, general latex products, foam sponge and light-colored products in general. In rug backings and foam sponge it imparts excellent resistance to the combustion products (nitrogen dioxide) from natural gas. NAUGAWHITE is easily emulsifiable for use in latex.

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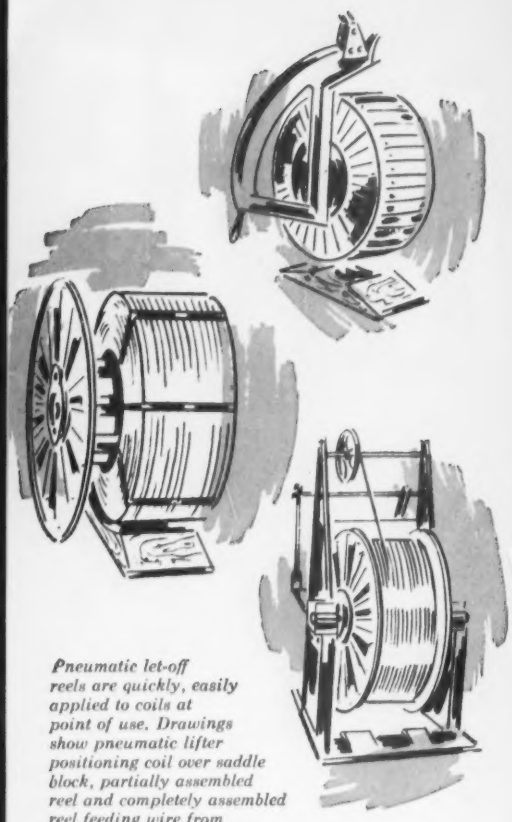
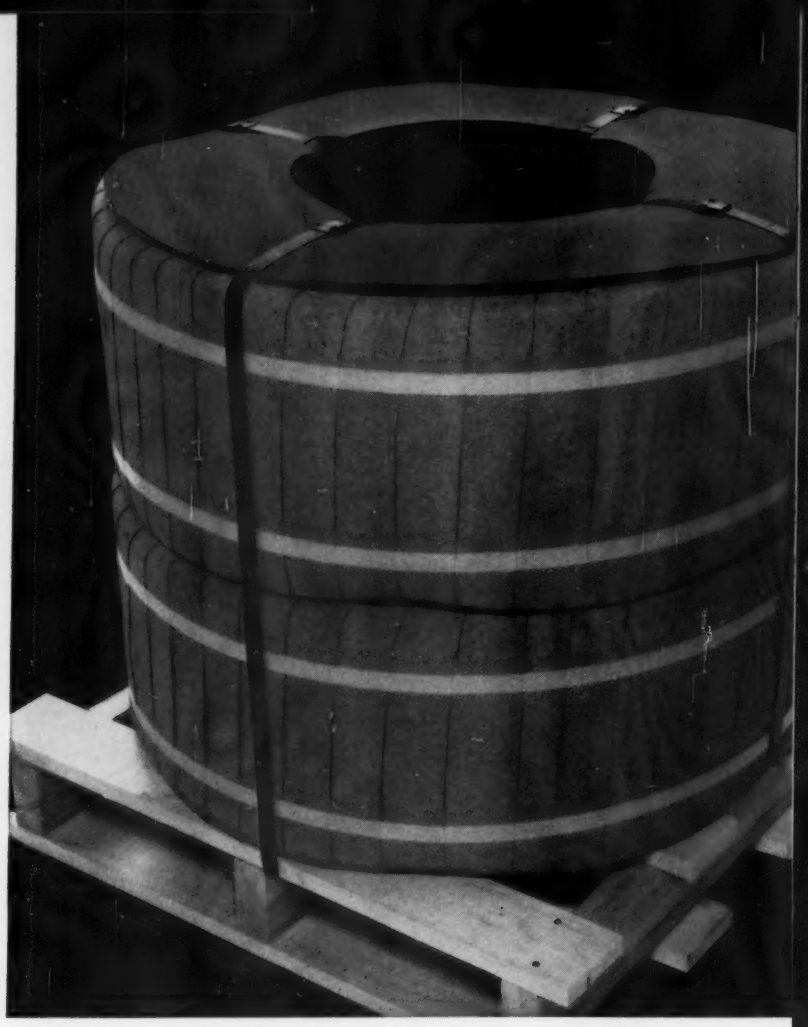


Pneumatic let-off reels are quickly, easily applied to coils at point of use. Drawings show pneumatic lifter positioning coil over saddle block, partially assembled reel and completely assembled reel feeding wire from conventional let-off stand.



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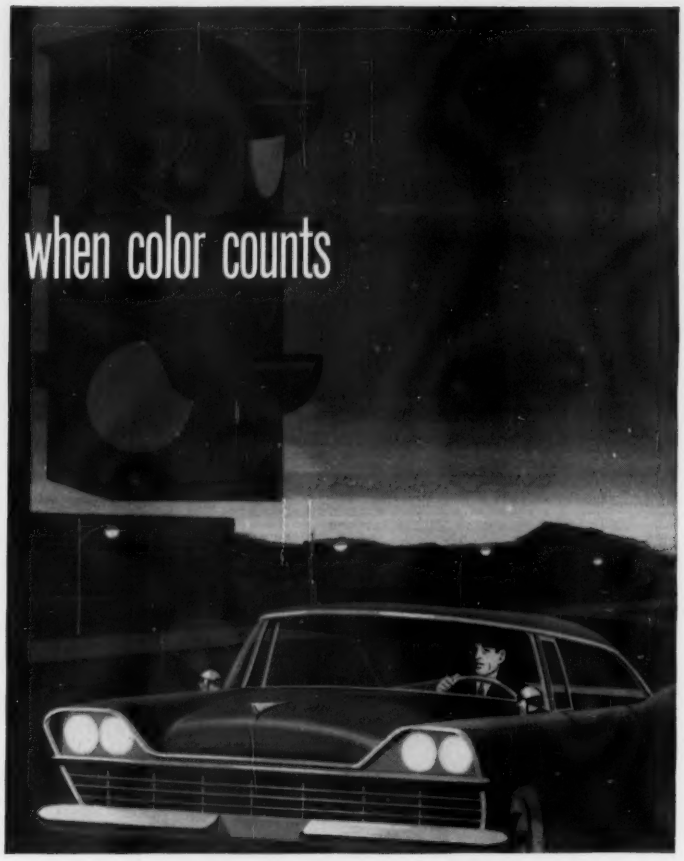

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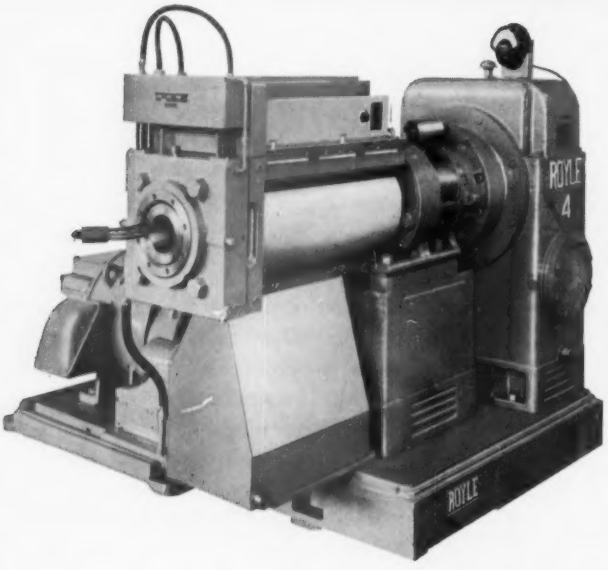

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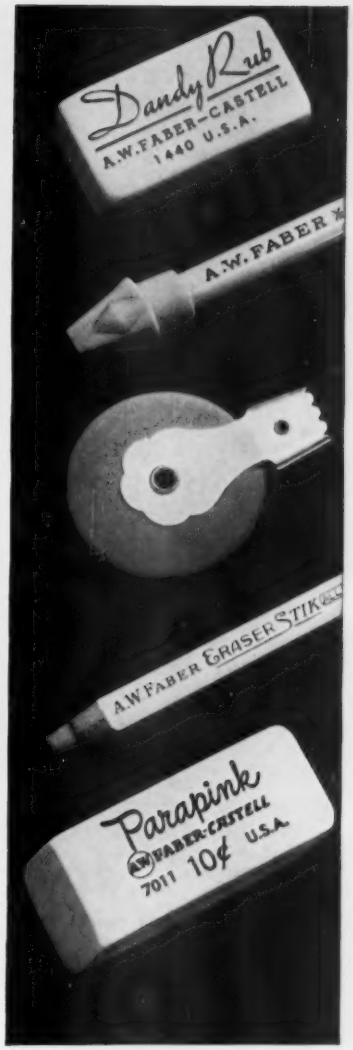

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COMING EVENTS

Nov. 17-21. Society of the Plastics Industry Annual National Conference, Morrison Hotel, Chicago, Ill.

Nov. 30-Dec. 5. A.S.M.E. Annual Meeting, Hotel Statler, New York, N. Y.

Dec. 2-4. Seventh Annual Wire and Cable Symposium, Berkeley-Carteret Hotel, Asbury Park, N. J.

Dec. 4. Fort Wayne Rubber & Plastics Group, Van Orman Hotel, Fort Wayne, Ind.

Dec. 5. Detroit Rubber & Plastics Group, Xmas Party, Statler-Hilton Hotel, Detroit, Mich.

Dec. 9. Buffalo Rubber Group, Xmas Party, Buffalo Trap & Field Club.

Dec. 12. New York Rubber Group, Xmas Party.

Dec. 12. Boston Rubber Group, Xmas Party, Hotel Somerset, Boston, Mass.

Dec. 13. Southern Ohio Rubber Group, Winter Meeting, Miami Valley Country Club, Dayton, Ohio.

Jan. 23, 1959. Akron Rubber Group, Sheraton Hotel, Akron, Ohio.

Jan. 23, 1959. Philadelphia Rubber Group, Poor Richard Club, Philadelphia, Penna.

Jan. 30-31, 1959. Southern Rubber Group, Statler Hotel, Dallas, Texas.

Feb. 2, 1959. Washington Rubber Group, Army-Navy Club, Washington, D. C.

Feb. 3, 1959. Los Angeles Rubber Group, Biltmore Hotel, Los Angeles, Calif.

Feb. 4-6, 1959. American Society for Testing Materials, Committee D-11, Pittsburgh, Penna.

Feb. 12, 1959. Fort Wayne Rubber & Plastics Group, Winter Meeting, Van Orman Hotel, Fort Wayne, Ind.

March 3, 1959. Buffalo Rubber Group Spring Meeting, Hotel Westbrook, Buffalo, N. Y.

March 20, 1959. New York Rubber Group, Technical Meeting, Henry Hudson Hotel, New York, N. Y.

April 3, 1959. Akron Rubber Group, Sheraton Hotel, Akron, Ohio.

April 16, 1959. Fort Wayne Rubber & Plastics Group, Spring Meeting, Van Orman Hotel, Fort Wayne, Ind.

May 1, 1959. Joint International Meeting, Buffalo Rubber Group-Ontario Rubber Section, C.I.C., Hotel Sheraton Brock, Niagara Falls, Ont.

May 12-15, 1959. Division of Rubber Chemistry, A.C.S., Spring Meeting, Biltmore Hotel, Los Angeles, Calif.

June 4, 1959. New York Rubber Group, Summer Outing.

June 9, 1959. Buffalo Rubber Group, Golf Outing, Lancaster Country Club.

Aug. 4, 1959. New York Rubber Group, Golf Tournament.

Oct. 13, 1959. Buffalo Rubber Group, Fall Meeting, Hotel Westbrook, Buffalo, N. Y.

Oct. 16, 1959. New York Rubber Group, Fall Meeting, Henry Hudson Hotel, New York, N. Y.

Oct. 19-21, 1959. Ninth Canadian High Polymer Forum, Guild Inn, Toronto, Ont., Canada.

Nov. 9-13, 1959. Joint International Meeting of Division of Rubber Chemistry, A.C.S.; Committee D-11, A.S.T.M., and Rubber and Plastics Division, A.S.M.E., Shoreham Hotel, Washington, D. C.

Dec. 18, 1959. New York Rubber Group, Xmas Party.

May 24-27, 1960. Division of Rubber Chemistry, A.C.S., Spring Meeting, Statler Hotel, Buffalo, N. Y.

Sept. 13-16, 1960. Division of Rubber Chemistry, A.C.S., Fall Meeting, Commodore Hotel, New York, N. Y.

May 16-19, 1961. Division of Rubber Chemistry, A. C. S., Spring Meeting, Brown Hotel, Louisville, Ky.

Sept. 5-8, 1961. Division of Rubber Chemistry, Fall Meeting, Sherman Hotel, Chicago, Ill.

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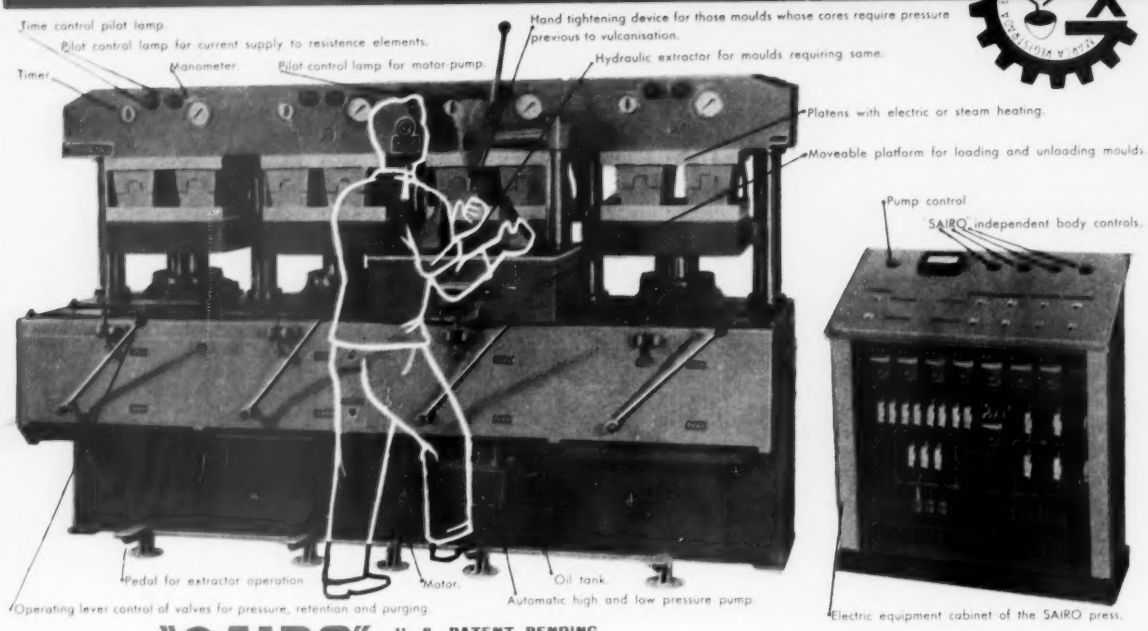
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It saves floor space and workers' transitional movements.

It comprises 4 presses in one together with its own motor pump.

One worker only required who loads and unloads the moulds in one element of the multiple press while the other three elements are vulcanising.

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It is completely automatic, including automatic temperature and vulcanisation cycle control.

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Subsidiary of **NATIONAL LEAD COMPANY**

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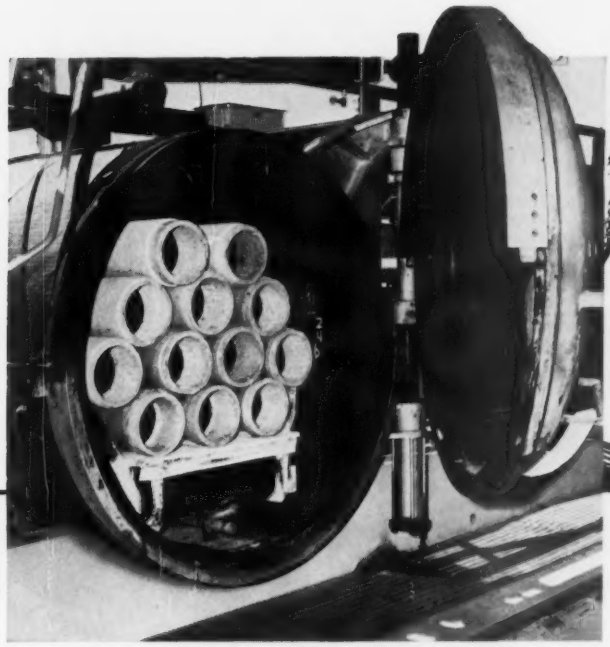
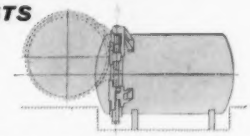


Memo to Production Engineers

◀ Adamson 90" dia. Hi-Lift Swing Door installed at Johns-Manville Products Corporation, Manville, N. J. One of many Adamson doors now in operation, or on order, for use in steam-curing TRANSITE® Pipe at J-M Plants in the U. S. and Canada.

Here are 6 important reasons why you should specify ADAMSON UNITED Hi-Lift Swing Vulcanizer & Autoclave Doors

1 LOWER INSTALLATION AND OPERATING COSTS



Adamson's lift-swing feature eliminates need for extended pit and expensive bridging. For example, on a 90" dia. door you can use an easily-handled loading bridge as short as 22".

2 TIGHT, LEAKPROOF SEAL

Adamson's special heat-resistant, self-sealing gasket utilizes vessel's internal pressure to assure a positive, leakproof seal.

3 EFFICIENT SLIDE-LOCK DESIGN

Provides virtually 360° of locking surface between door and mating shell ring. *Twice* the locking area of conventional breech-lock doors!

4 SAFE, RELIABLE OPERATION

Equipped with automatic door locking pins. Can be furnished with optional steam interlock controls for complete safety. Other built-in safety features included.

5 STRONGER CONSTRUCTION

Conventional castings are replaced by sturdy pressed steel head welded to continuous roll forged locking rings.

6 FAST OPENING AND CLOSING

Quick-unlocking, vertical-lift action powered by hydraulic cylinder. Door swings easily on anti-friction and bronze sleeve bearings. Simple, trouble-free operation.

7067

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We offer a wide range of door sizes and pressures, available as integral equipment on vessels supplied by us, or as separate units for mounting on tanks made by other manufacturers. Write for catalog No. 562.

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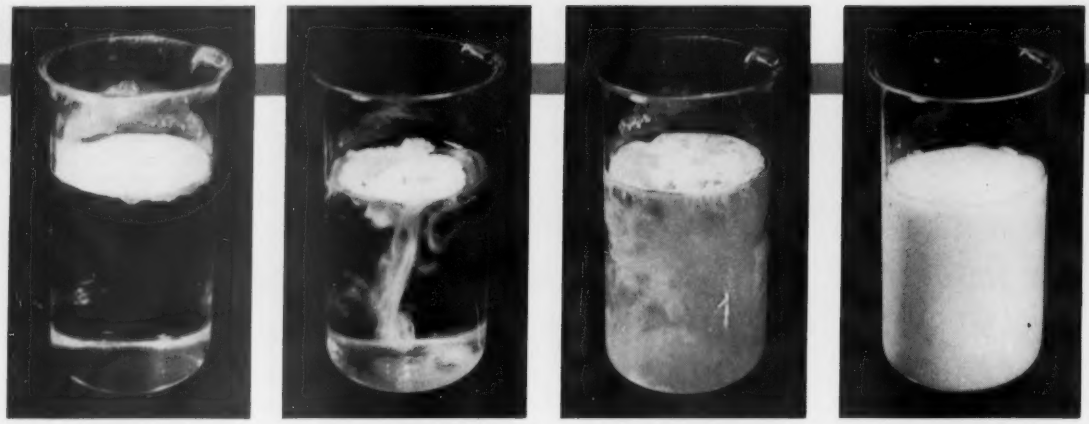
CUT YOUR LATEX COMPOUNDING COSTS WITH . . .

EASY-DISPERSING

PROTOX® ZINC OXIDES



START

5 grams of Protox-169 zinc oxide were added to 300 cc of distilled water.

5 SECONDS

The floating Protox mass starts swirling; dispersion begins.

20 SECONDS

Turbulent diffusion is evident throughout the water.

15 MINUTES

In the absence of a dispersant and without stirring, much of the pigment is disseminated.

Here you see the spectacular manner in which Protox zinc oxides diffuse when a small quantity is added to distilled water . . . without any stirring whatever. Only Protox zinc oxides (Nos. 166-168-169) display this phenomenon, which stems from their unique coating of zinc propionate* and their freedom from hard-to-disperse aggregates. This demonstration does not, of course, imply elimination of the commonly used dispersants or the omission of pebble-mill or colloid-mill grinding.

HOW PROTOX ZINC OXIDES CUT YOUR COSTS

compared with conventional zinc oxides

1. **Shorten grinding time**
2. **Require less dispersing agent**
3. **Produce dispersions with lower water content**

*U. S. Patents 2,303,329 and 2,303,330

THE NEW JERSEY ZINC COMPANY

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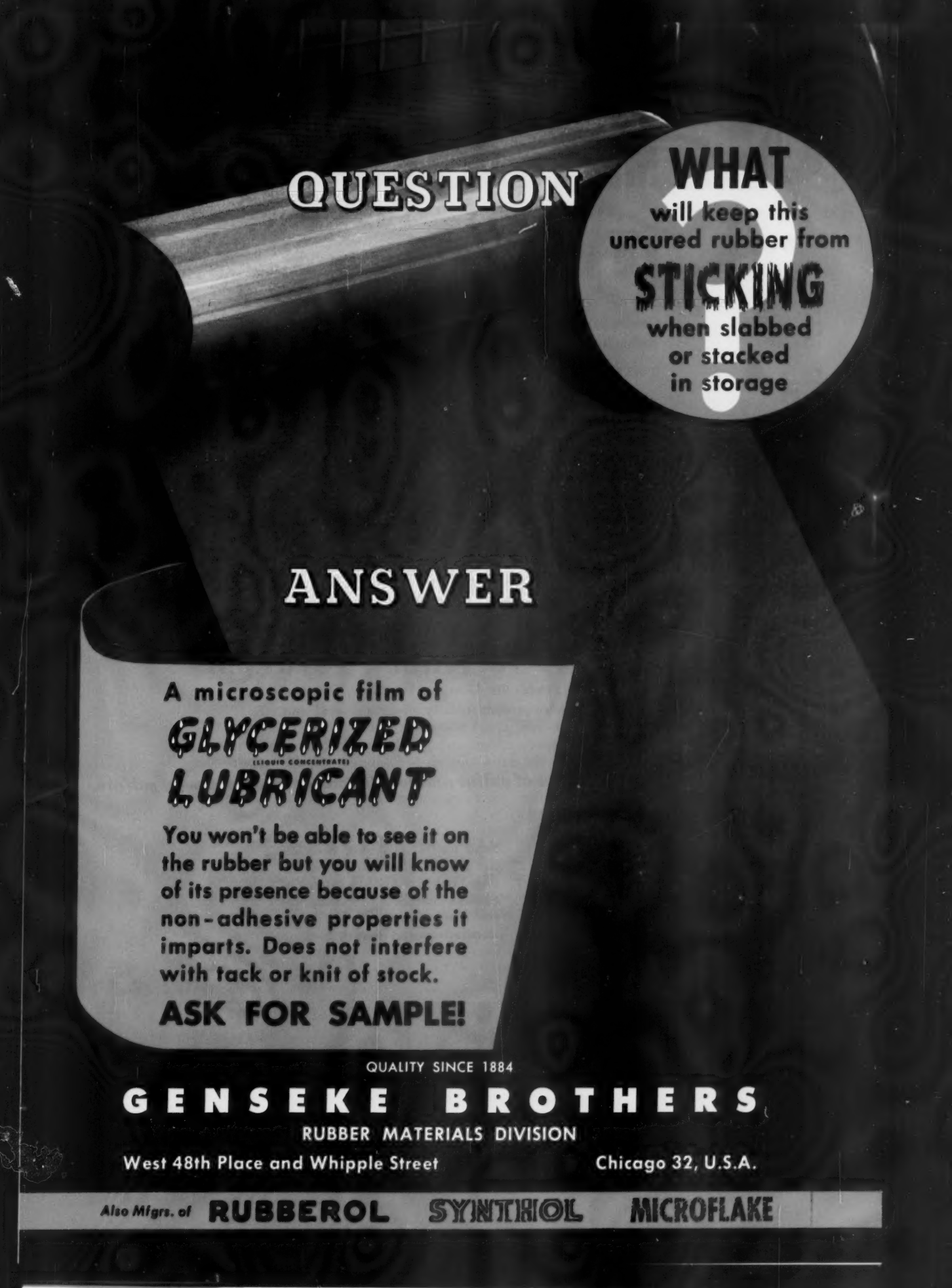
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You won't be able to see it on the rubber but you will know of its presence because of the non-adhesive properties it imparts. Does not interfere with tack or knit of stock.
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An aqueous dispersion, 68% sulfur, of particles averaging less than 2 microns in diameter.

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Specially formulated and standardized for tires, tubes and rubber specialties. Pure sulfur content from 68% (dispersed) to 99.8%. Sizes from 80- to 325-mesh.

CRYSTEX® INSOLUBLE SULFUR

Stauffer's insoluble sulfur, "Crystex", is a thermoplastic high polymer with a molecular weight in the order of hundreds of thousands. At least 85% of this material is insoluble in uncured rubber . . . does not migrate . . . eliminates "bloom".

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Moisture degradation — Gen-Tac keeps this from happening to your tires. Cord treated with Gen-Tac adheres to rubber so well that moisture doesn't "wick" in to loosen the cords.

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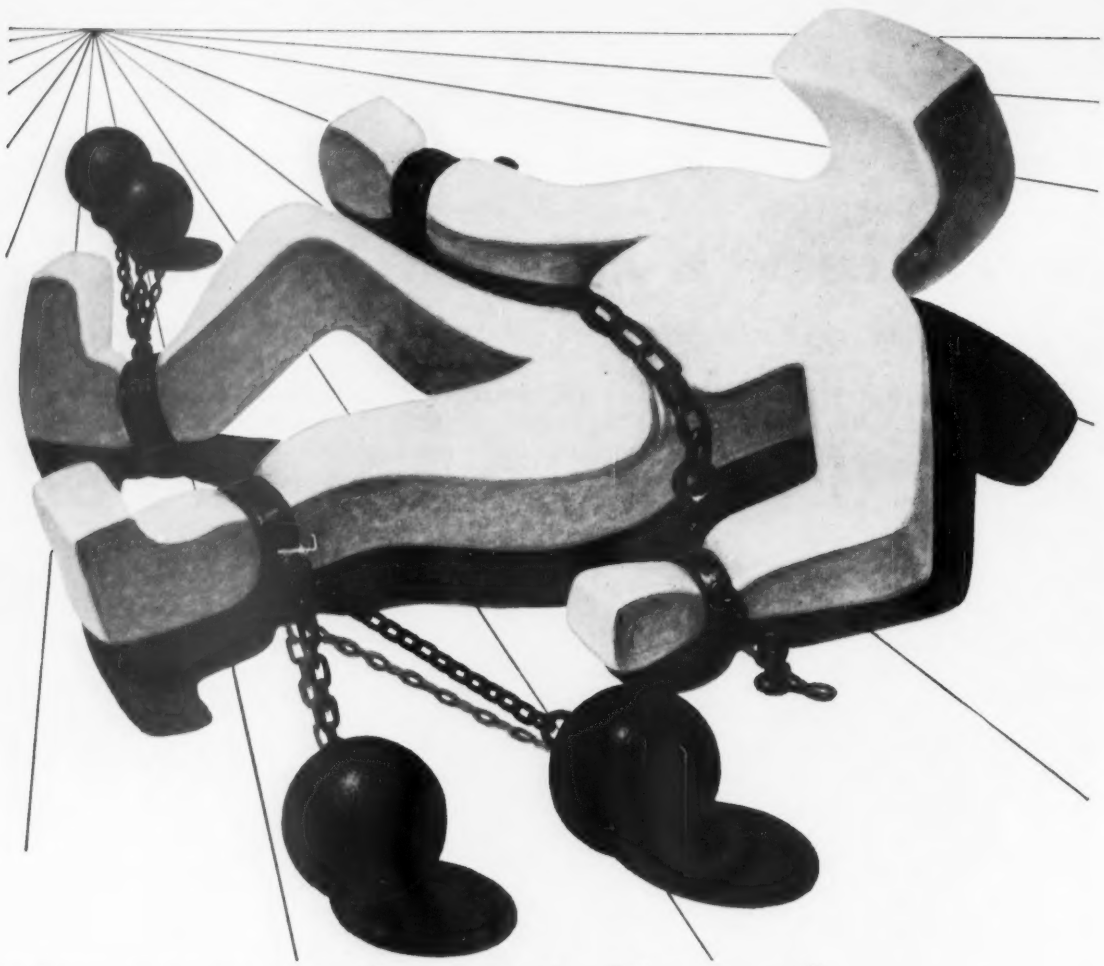

Famous escape artist meets his match

You've seen what often happens to bales of uncured synthetic rubber during shipment and storage. Subject to a condition called "cold flow," the uncured product was once an incorrigible "escape artist." It flowed, settled and burst from ordinary packages. Escaped rubber stuck to bits of cardboard, paper and dirt. Once contaminated, it was difficult to process the rubber into quality products.

Shell Chemical has solved this "sticky" problem—by caging 42 film-wrapped bales of synthetic rubber in a strong, lightweight, steel-strapped wooden container of unique design called the Flotainer*.

Completely new in principle, the Flotainer keeps rubber in check, prevents contamination, reduces waste, speeds handling, and lets you store 20 tons of rubber on less than 100 sq. ft. of floor space.

Leadership in packaging and delivery, plus versatility of product are qualities that customers have learned to expect from Shell Chemical. In addition—a specialized research and development organization devoted to general-purpose synthetic rubber assures prompt, dependable technical assistance.

**Flotainer* is a Shell Chemical Trademark.*

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Fill out and mail this coupon for a complete description of the Flotainer—plus a catalog of Shell synthetic rubbers and latices.

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SHELL

Capitol Cues

TALK OF A NEW BUSINESS BOOM IS BEGINNING TO CROP UP among economists and government officials. They're pondering the chances of another spate of feverish, speculation-filled activity—not just a steady rise in business. To be sure, relatively few of the experts think the present upturn will "go through the roof" next year. Still, the possibility is worth study because renewed boom would call for major buying and other decisions by businessmen. Government officials would have to take tougher measures to fight inflation.

What prompts all the talk of new boom is the rapidity of the business pick-up that began last Spring. It has been greater than the other two postwar recoveries. In fact, industrial production has made up three-quarters of its recession loss in just a few months. If the pick-up were to go on at this rate, we'd be in the midst of a boom before 1959 is very old.

Several things make economists doubtful that a new boom will develop. For one thing, officials have tightened money very considerably since Spring. This could slow down housing and business investment. (There's an excess of capacity in just about every line, anyway.) And, once industry has rebuilt its inventories, its orders may fall, slowing momentum some.

CHRISTMAS SALES WILL MAKE MERCHANTS HAPPY. Volume won't be really boomy, though it will be up a quiet 2% or 3% over last year's holiday buying. Certainly, the stage is set for a moderate pick-up. More folks are working these days...at longer workweeks...and styles are new in clothes and autos. Also, many families are ready to start up on buying put off during the slump.

- Soft goods will show relatively small gains over the sales racked up during Christmas of 1957—2% for clothing, 3% or 4% for shoes, 2% for home-furnishings, and 5% for food-liquor.
- Hard goods will improve faster. Bigger home sales will lift furniture sales 3% or 4%. Appliances will benefit, too. Auto sales will show more life than earlier this year, though they won't match last Fall's. Auto accessory sales will continue strong. Building supply sales should do some 5% better.

SOME REDUCTIONS IN THE RAILROADS' FREIGHT RATES will be made soon. The roads have long wanted to recapture the business lost to trucking lines. This past Summer, Congress gave them the go-ahead—saying that they can set rates now even if the new rates under-cut those of competing transportation. Currently, first applications for permission to cut are reaching Washington. The first drops will come in the Midwest on bulk items such as steel scrap.

ANOTHER HIKE IN FIRST CLASS POSTAL RATES is being drafted by postal officials for submission to Congress next year. The new figure would be 5¢ an ounce—instead of the 4¢ that took effect in August. Mail going over 200 miles would automatically go by air, at the 5¢ rate. But soundings indicate that Congress won't approve any hikes so soon after this year's increases.

(Continued on Next Page)

FINAL RULES FOR REPORTING BUSINESS EXPENSES for tax purposes have now been issued by the Treasury Department. After all the fuss the question had raised, the new rules require little change from old accepted practices. Before Treasury officials finally backed off, they insisted that employees report reimbursements for expenses as income, then deduct amounts paid out. Now, you don't have to report any reimbursed allowances on your tax return if you are already accounting for expenses to your employer or your company.

Detailed reports are still required in three cases:
- When expense money is not reported in detail to the company.
- When expenses exceed allowances and the excess is deducted.
- When the employee owns a share of the business employing him.

NOTE THE NEW RULES GIVING PARTNERSHIP TAXATION to small corporations just issued by the Internal Revenue Service. They let businessmen enjoy the advantages of incorporation while escaping unfavorable tax consequences. In a word, a firm can have limited liability and the continuity of a corporation (even when a principal withdraws) and still avoid double taxation of the corporation's income. Also, when a business incorporates, its owners can become "employees" and deduct costs of health, pension, and insurance plans.

To get these benefits, a corporation must be an independent, domestic company having no more than 10 stockholders and only one class of stock. The corporation must notify Internal Revenue of its desire to take advantage of the new rules in the first month of its taxable year, or in the month that just precedes this. It simply fills out and files Form 2553.

VICE-PRESIDENT NIXON'S PROPOSALS FOR TAX CUTS for corporations and high-bracket individuals are getting intensive study by tax experts. Nixon is playing an ever-larger role in shaping government policies now—and may have a bigger one in two years. This automatically gives his ideas weight.

The Vice President has suggested imposing an excise on all manufactures, in addition to the cuts in corporate and high-bracket incomes. His aim is to free more money for investing in industry, by taxing away less of it than is taken today.

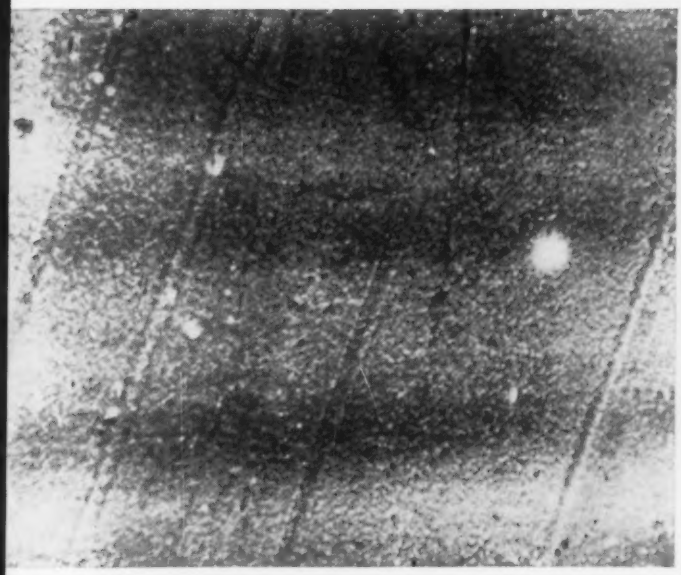
But the new Congress that will meet in January is certain to ignore Nixon's suggestions. Its liberal majority will say that the plan would shift the tax load to lower brackets. Democrats will have the votes to kill it—this year. But this is one of those ideas that don't die easily, and may fare better in 1960.

BUSINESS WILL TAKE A BIGGER HAND IN POLITICS FROM NOW ON. This sort of thing has been brewing for years, prompted by fear in industry that labor is being given a clear field to put over its own philosophy. The GOP defeat in Maine was the last straw for many business leaders. Now, they are ready to take the offensive and have begun to map their strategy.

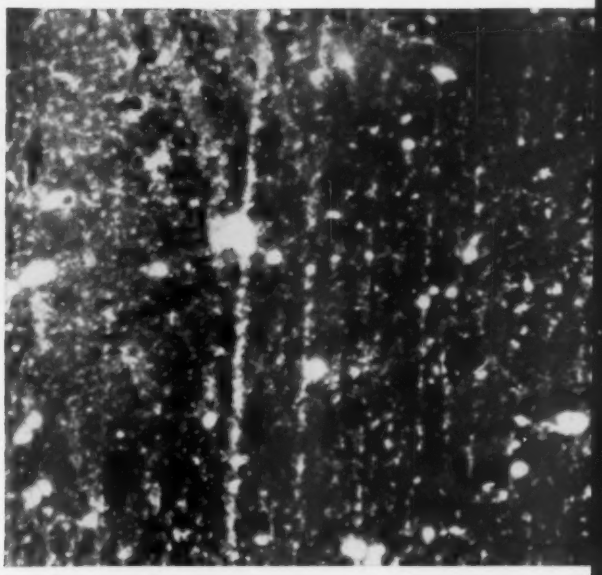
What counter-measures do businessmen have in the works?
- Asking stockholders to note company interests when voting.
- Trade association action to raise money to inform workers.
- Encouraging executives to enter rough-and-tumble politics.

Here's why Goodrich-Gulf can say:

TRY A TON OF AMERIPOL MICRO-BLACK...AT OUR RISK!



Photomicrograph of Ameripol 4650, after one minute of milling.



Photomicrograph of SBR 1601, after one minute of milling.

Compare uniformity of dispersion

Better carbon-black dispersion in your recipe means better wearing qualities in your finished product. The photomicrographs above (100x) prove the superiority of dispersion in new Ameripol Micro-Black masterbatch. That's why we invite you to prove it for yourself, at our risk. Here's how.

Make Goodrich-Gulf's Try-a-Ton Test

Let us ship you a ton of Ameripol Micro-Black. Use it to make your product. Then compare results with current production. We are confident that you will find superior batch uniformity with Ameripol Micro-Black, and greater abrasion resistance in your finished product.

Goodrich-Gulf Chemicals, Inc.

Our Guarantee: *Ameripol Micro-Black gives you superior dispersion over conventional dry mixes—reduces handling costs and time—or the test ton costs you nothing!*

Phone or write for your Test-Ton now

Call HEnderson 2-1000 in Cleveland, Ohio. Ask for J. E. Miller, Vice President in Charge of Sales. Call him now or mail coupon.

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- ☐ Count me in on your Try-a-Ton Test.
- ☐ Send me Ameripol 4650 (55 part H.A.F. black).
- ☐ Send me Ameripol 4651 (62½ part H.A.F. black).
- ☐ Phone me for shipping instructions.

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PROGRESS UNDER PRESSURE—Typical of Southern Railway's emphasis on progress, safety and modernization is a unique, four-mile compressor system installed in its yards in Birmingham, Alabama. Air hoses similar to the one shown are spaced at 1000 ft. intervals and are fed by means of a 4" pipe from a central compressor reservoir. When three or more of these hose extensions are hooked up to a freight train, the necessary air pressure can be built up in much less time than by charging with pressure generated from the locomotive. Another important advantage to this independent source of air pressure is that it permits the discovery and repair of line leaks before the engine is coupled to the train, thus minimizing the possibility of expensive delays. The hose used for this air pressure system was supplied by Carolina Rubber Hose Company and made from Mount Vernon duck.

This is another example of how fabrics made by Mount Vernon Mills, Inc. and the industries they serve, are serving America. Mount Vernon engineers and its laboratory facilities are available to help you in the development of any new fabric or in the application of those already available.

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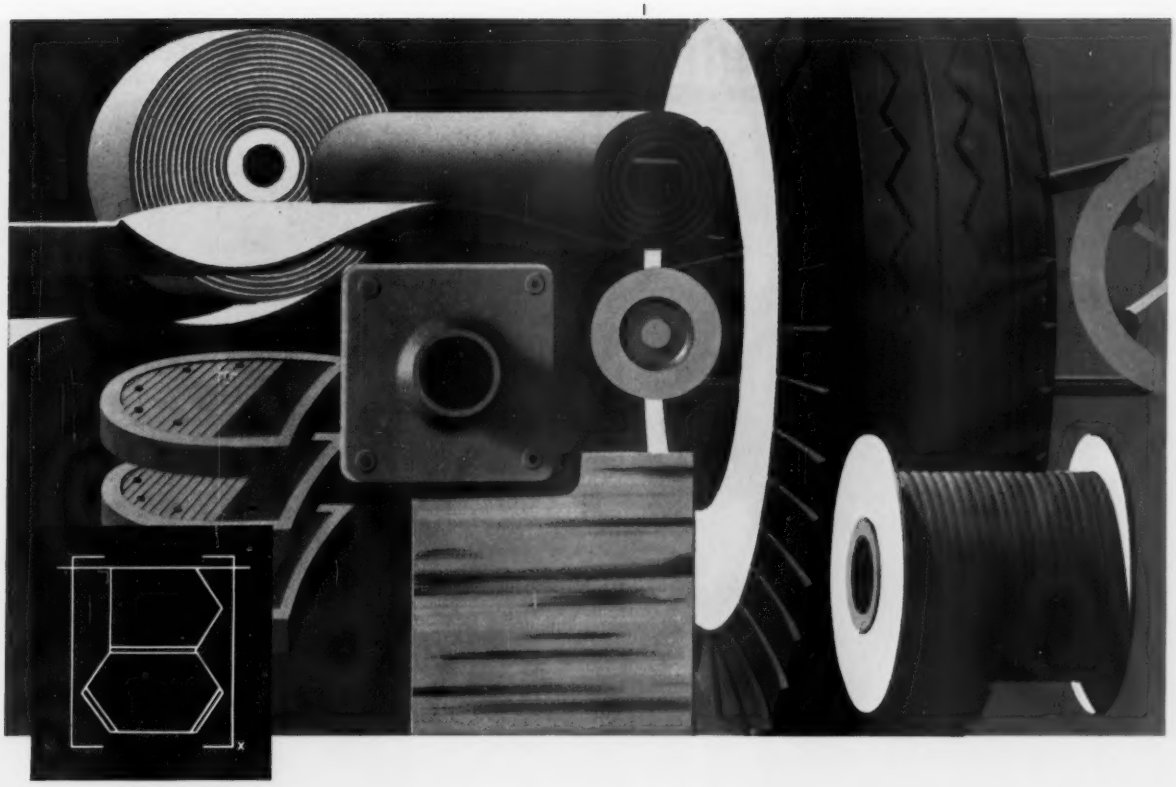

Raise Quality and Lower Costs With Neville Coumarone-Indene Resins

Coumarone-indene resins by Neville have become standard in the processing of rubber for an ever-increasing variety of products in ever-greater volume throughout the years. Here's why. Users find that Neville gives them constant good quality and fast service, and they save production time and costs and produce better products when they use coumarone resins. Also, Neville has a broad variety of these ideal extender-plasticizers in various grades and melting points to suit every product need. Our chemists will gladly assist yours in selecting the proper one for your purpose. Use the coupon to write for further information.

Neville Chemical Company, Pittsburgh 25, Pa.

Resins—Coumarone-Indene, Heat Reactive, Phenol Modified Coumarone-Indene, Petroleum, Alkylated Phenol • **Oils**—Shingle Stain, Neutral, Plasticizing, Rubber Reclaiming • **Solvents**—2-50-W Hi-Flash*, Wire Enamel Thinners, Nevsolv*.

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The oil-resistant, ozone-resistant nitrile rubber

LEFT: PARACRIL OZO SOLE on test pair of shoes worn in direct contact with steel chips and oil, 5 days a week, for a full six months, on and off the job. Shows substantially less wear than standard oil-resistant sole at right.

RIGHT: PARACRIL OZO HEEL on the other test shoe is still like new, while standard oil-resistant heel at left is worn smooth and beginning to crack.

New sole material outwears others 3 to 1!

New PARACRIL® OZO—developed by the Naugatuck Chemical Division of U. S. Rubber is a shoe sole and heel material amazingly long-lasting—far superior to all others on the market. What's more, they are available in bright, permanent colors!

Compared with one of the toughest materials known, new PARACRIL OZO heels and soles are:

- *277% more abrasion resistant!*
- free of flex growth after 25,000 cycles
- 5 to 10 times more resistant to fuels and oils than existing standard oil-resistant shoe soles.

Find out about PARACRIL OZO's heel, sole, and shoe selling advantages NOW! Write us for further information.

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RUBBER AGE
Vol. 84 No. 2
November, 1958

Colorimetric Determination of Amine Antioxidants

By C. L. HILTON
Research Center, U. S. Rubber Co., Wayne, N. J.

A simple method for the qualitative identification and quantitative estimation of many of the common amine antioxidants

SEPARATION of amine antioxidants from a mixture of compounding ingredients by steam distillation *(5)* or chromatographic techniques *(1, 7, 8, 9, 12, 16, 17)* has been reported. However, these techniques are tedious, require five or six man hours per separation, and use large quantities of solvents. Ultraviolet analysis of the proper fraction in the case of the elution technique will give the amount of amine antioxidant present. However, the ultraviolet absorption spectra of most amine antioxidants are so similar as to make identification by this means difficult. The identification of amine antioxidants is usually accomplished by color reactions *(2, 3, 4, 6, 10, 11, 14, 15)*. The best of these color reactions appears to be the coupling with diazotized *p*-nitroaniline first reported by Burchfield and Judy *(4)*. This has been the basis for the qualitative and quantitative method developed in these laboratories *(15)*.

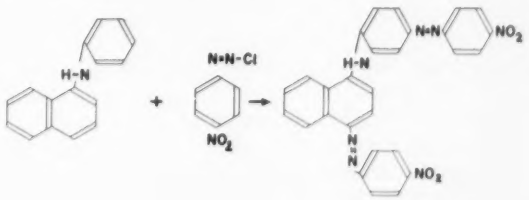
A procedure using glacial acetic acid as the solvent and covering only ten of the common antioxidants has been developed by our personnel. Because of the severe blistering which can be caused by glacial acetic acid it seemed desirable to search for a more satisfactory solvent system. A study, described in this paper, was undertaken. At the same time, the coverage was extended to about thirty of the common commercial amine antioxidants. The solvent (acetone) reported by Mensik *(13)* for phenyl-beta-naphthylamine was found to be unsatisfactory for most of the other antioxidants. The solvent system found to be most satisfactory was 25% concentrated hydrochloric acid and 75% methanol (by volume).

Note: This paper was presented at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Pittsburgh, Penna., March 5, 1958.

Method

The method of determining antioxidants described here consists of extraction of the antioxidant from the sample and formation of an azo dye by the use of a coupling agent. By the use of a spectrophotometer, the exact shade and intensity of color are measured—the former identifies the antioxidant and the latter determines its concentration.

The color formation is illustrated by the following example:



COLORLESS NEOZONE A | COUPLING REAGENT | AZO DYE

The formation of dye differs from the usual commercial reaction in three ways. First, the dye is produced in minute quantities. Secondly, the reaction

TABLE I—SLIT WIDTHS USED IN THE DETERMINATION OF AMINE ANTIOXIDANTS

Wavelength (Millimicrons)	Slit Width (Millimeters)	Wavelength (Millimicrons)	Slit Width (Millimeters)
350	0.054	550	0.006
375	0.029	575	0.006
400	0.017	600	0.008
425	0.012	625	0.012
450	0.009	650	0.018
475	0.007	675	0.027
500	0.006	700	0.043
525	0.006		

takes place in an organic solvent medium rather than in aqueous solution or suspension. Thirdly, a large excess of coupling agent has to be used, since the quantity and identity of the aromatic amine are unknown.

Experimental Procedure

Apparatus. All of the absorption measurements were made on a Cary Model II Spectrophotometer using quartz cells having a light path of 1.000 cm. The slit widths used were as shown in Table I.

Reagents. The reagents used were:

Methanol—DuPont's Pure Synthetic Methanol (99.85%).

Hydrochloric Acid—Baker's "Analyzed Reagent" grade, specific gravity 1.188 (37.2% hydrochloric acid by weight).

p-Nitroaniline—Matheson, Coleman and Bell, m.p. 146 to 147°C.

Sodium nitrite—Baker's Analyzed Reagent grade.

Coupling agent—2.800 gm. (0.0203 moles) of *p*-nitroaniline is dissolved in 32 ml. of hot concentrated hydrochloric acid and the solution is diluted with distilled water to 250 ml. After cooling to room temperature the volume of liquid is adjusted to exactly 250 ml. A second solution is made containing 1.44 gm. (0.0209 moles) of sodium nitrite in exactly 250 ml. of distilled water. Both of the above solutions are reputed to be stable indefinitely. Twenty-five ml. of each of these solutions are pipetted into separate 100 ml. beakers and are chilled in ice to below 10°C. The contents are mixed by combining the solutions and pouring back and forth from one beaker to the other. Pure nitrogen is bubbled through the mixture as it is allowed to warm to room temperature. Finally, ten mg. of urea (or one ml. of 0.1 gm./10 ml. solution) is added to destroy any excess nitrous acid. The reagent becomes cloudy after an hour or so but is suitable for use for several hours. Fresh reagent should be made every day.

Preparation of methanol-hydrochloric acid solvent. Three volumes of methanol are placed in a glass stoppered bottle and one volume of concentrated hydrochloric acid is added gradually with gentle mixing. The mixture is allowed to come to room temperature before carrying out the analyses.

Spectra of Different Antioxidants

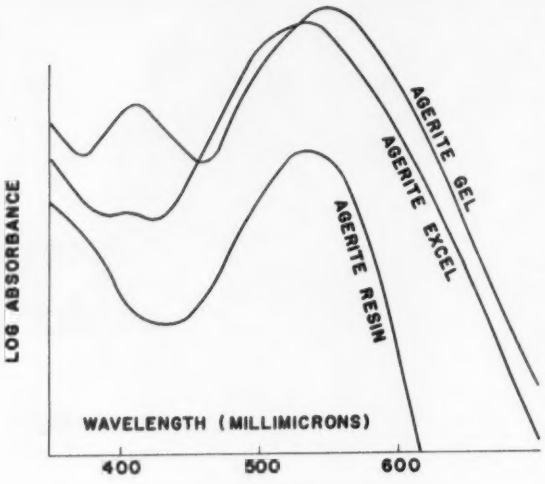


Figure 1

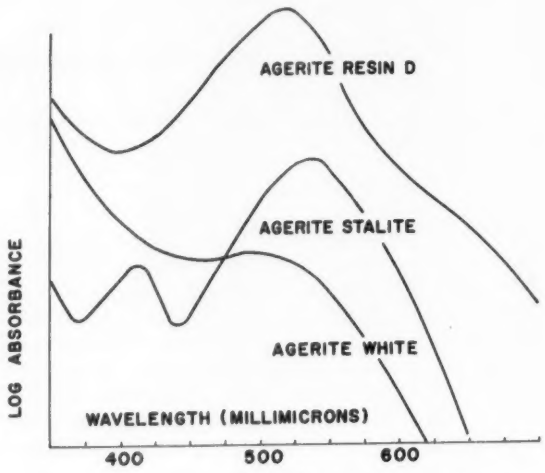


Figure 2

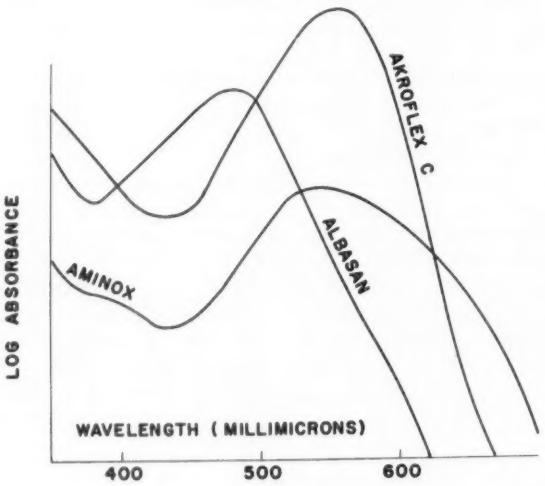


Figure 3

Spectra of Different Antioxidants

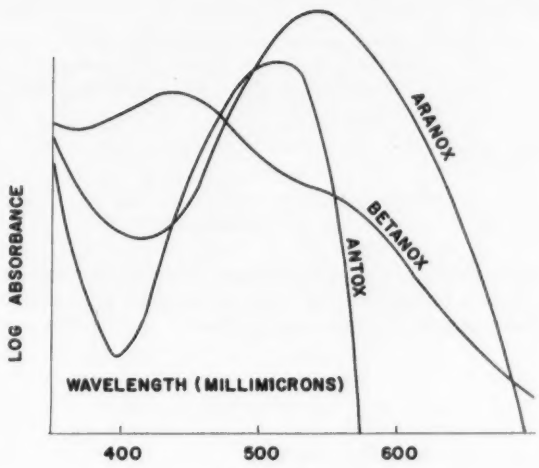


Figure 4

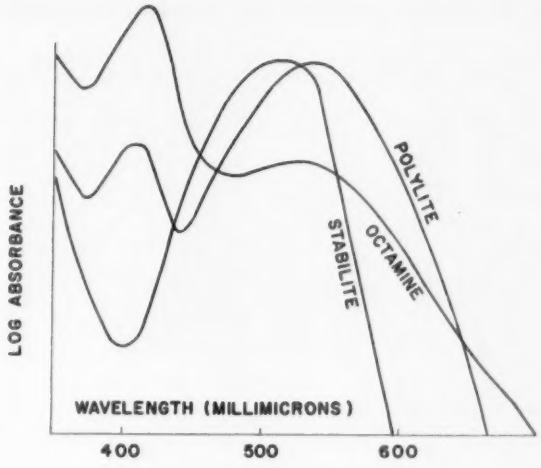


Figure 7

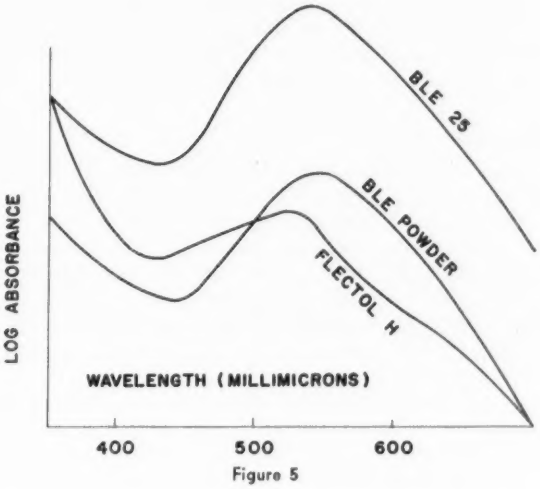


Figure 5

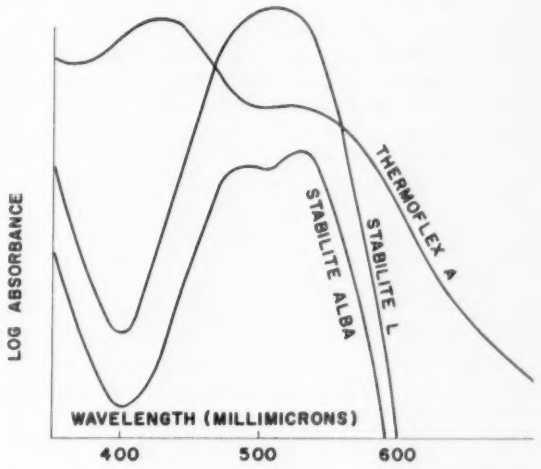


Figure 8

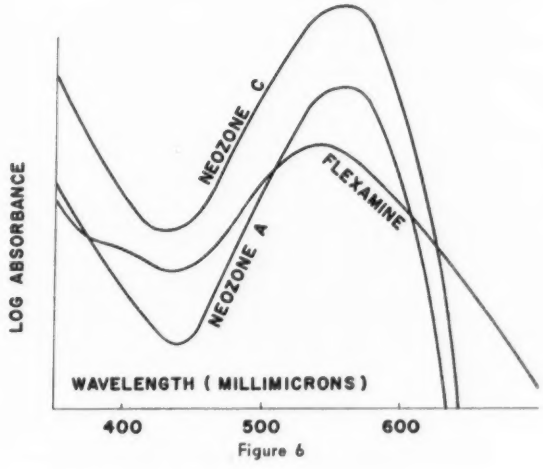


Figure 6

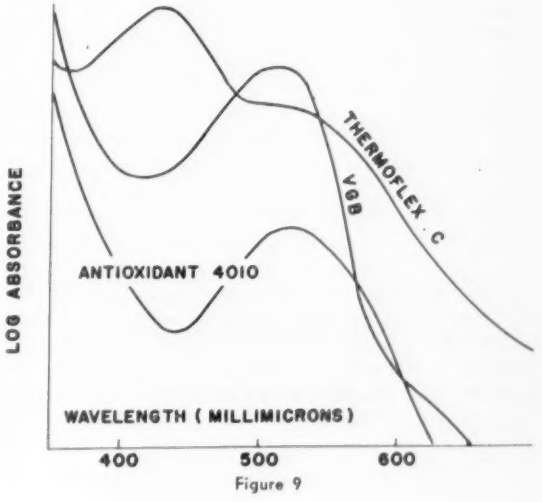


Figure 9

TABLE II—EQUATIONS FOR ANTIOXIDANTS WHICH CAN BE DETERMINED BY THE REGULAR PROCEDURE

Antioxidant	Equation % Antioxidant =	Antioxidant	Equation % Antioxidant =
Agerite Excel	$1.30\ A_{594}$	Flectol H	$3.02\ A_{525}$
Agerite Gel	$1.76\ A_{555}$	Flexamine	$1.61\ A_{540}$
Agerite Resin	$1.13\ A_{504}$	Neozone A	$0.443\ A_{557}$
Agerite Resin D	$3.10\ A_{502}$	Neozone C	$0.606\ A_{557}$
Agerite Stalite	$1.37\ A_{507}$	Octamine	$3.79\ A_{439}$
Akroflex C	$0.778\ A_{555}$	Polylite	$2.07\ A_{507}$
Albasan	$3.99\ A_{495}$	Stabilite	$1.40\ A_{502}$
Aminox	$1.18\ A_{547}$	Stabilite ALBA	$0.668\ A_{502}$
Antox	$1.49\ A_{512}$	Stabilite L	$0.573\ A_{515}$
Aranox	$0.902\ A_{540}$	Thermoflex A	$2.98\ A_{425}$
*Betanox	$3.13\ A_{438}$	Thermoflex C	$2.87\ A_{425}$
BLE-25	$0.720\ A_{528}$	VGB	$2.62\ A_{515}$
BLE Powder	$1.43\ A_{506}$		

* Coupled color insoluble in methanol-hydrochloric acid. Equation is for sample coupled in methanol-hydrochloric acid and diluted with glacial acetic acid.

Procedure. The sample to be analyzed must be very thinly sheeted (or powdered by passing through a Wiley Mill). Weigh a 1.0000 ± .0005 gram sample. Wrap with extraction cloth which has been previously extracted to remove sizing, etc. Place in an Underwriter's extraction cup and extract for 16 hours with 95% ethanol or methanol. Transfer the alcohol extract to a 100 ml. volumetric flask. Cool to room temperature and bring to the mark with the extraction solvent. Transfer a ten ml. aliquot to a 100 ml. volumetric flask. Add 15 ml. methanol-hydrochloric acid solution and one ml. of coupling agent. Place in dark for 1½ hours and then bring to the mark with methanol-hydrochloric acid. Determine the absorption spectrum from 700 millimicrons to 350 millimicrons using a Cary Spectrophotometer. (Note: Other spectrophotometers may be used with proper calibration.)

Plot the absorbance readings on Keuffel and Esser semilogarithmic graph paper 359-H-71, 3 cycles X 10 to the inch. Compare the resulting spectrum with Figures 1 through 9 for identification of the antioxidant. (Note: If a red color is formed immediately upon coupling and the color then fades to an amber or brown, it is likely that one of the antioxidants containing phenyl-beta-naphthylamine (PBNA) is present. In this case an alternate procedure must be used.)

Alternate procedure for PBNA. Extract as indicated in the regular procedure. Take a ten ml. aliquot from the 100 ml. volumetric flask. Bring almost to the mark with methanol-hydrochloric acid mixture and add one ml. of coupling agent. Bring exactly to the mark, mix and immediately determine the absorbance. The absorbance will rise to a maximum in 2 to 5 minutes after coupling. Use this maximum absorbance in calculating the amount of antioxidant present. Calculate per cent antioxidant using the equations in Table III.

Development of equations. The equations are developed as follows:

$$\text{Let } W = AC \tag{1}$$

where W = weight of antioxidant in grams,
A = absorbance at the wavelength concerned, and
C = concentration in grams of antioxidant per 100 ml. required for absorbance of 1.000.

Then

$$\% \text{ Antioxidant} = \frac{100\ (AC)}{0.1\ (\text{sample weight})} \tag{2}$$

The factor 0.1 is used because of a ten ml. aliquot which is taken from a 100 ml. sample. If a 1.000 gram sample is always taken, then

$$\% \text{ Antioxidant} = 1000\ (AC) \tag{3}$$

The equations for the various antioxidants are given in Tables II and III.

The antioxidants for which the method has been found to be unsatisfactory are Agerite White, Antioxidant 4010, BXA, Eastozone 32, JZF (DPPD), OZO 88, Santoflex AW, Santoflex BX, Santoflex DD, Santoflex 35, Santoflex 75, Tenamine 2, Tenamine 30, Tonox, Tonox D, U.O.P. 88 and U.O.P. 288.

Experimental Results

All of the antioxidants listed in Tables II and III conform with Beer's Law. Figure 10 shows this conformity for four of these antioxidants.

Results with stocks containing known amounts of Agerite Stalite, BLE-25 and PBNA are shown in Table IV. For all of these, known amounts of the antioxidant were milled into Synpol-1502 and the antioxidant content was checked by ultraviolet absorption analysis.

The method does not cover all the commercial amine antioxidants. However, the coverage is considerably greater than any of the methods previously reported. Further work would be required in order to take care of all the possible causes for the failure of the method. It might be well to discuss a few of these possibilities:

Mixtures of antioxidants. If both antioxidants can be found in Table II, the spectrum usually indicates which antioxidants could be present. Synthetic

TABLE III—EQUATIONS FOR ANTIOXIDANTS CONTAINING PBNA REQUIRING ALTERNATE PROCEDURE

Antioxidant	Equation % Antioxidant =	Antioxidant	Equation % Antioxidant =
Agerite HIPAR	$1.67\ A_{534}$	Neozone D	$1.25\ A_{534}$
Agerite HP	$2.47\ A_{534}$	PBNA	$1.25\ A_{534}$
Agerite Powder	$1.25\ A_{534}$	Thermoflex A	$2.49\ A_{534}$
Akroflex CD	$1.92\ A_{534}$	Thermoflex C	$2.12\ A_{534}$

mixtures can then be prepared and the spectrum of the coupled mixture determined.

Oxidized antioxidants. Since oxidized antioxidants will couple differently depending upon the type of antioxidant and the extent of oxidation, the method will not work if much oxidation has taken place.

Strongly colored alcohol extract. If the interference is mostly at the shorter wavelengths, 350 to 425 millimicrons, some correction can be made by coupling a ten ml. aliquot and a five ml. aliquot. Determine the absorption spectra of these solutions using a five ml. aliquot (containing no coupling agent) diluted to 100 ml. with methanol-hydrochloric acid as the solution in the blank cell. In this way most of the interference from other material can be eliminated. The difference between the spectrum of the coupled ten ml. aliquot and the coupled five ml. aliquot is taken as the correct spectrum for a coupled five ml. aliquot. If this corrected spectrum matches one of the spectra in Figures 1 to 9, the quantitative determination is made by multiplying by two the value found by using the equation for the antioxidant concerned. This takes care of the fact that a five ml. rather than a ten ml. aliquot is used.

TABLE IV—RESULTS OBTAINED WITH METHOD ON STOCKS CONTAINING KNOWN AMOUNTS OF ANTIOXIDANTS

Per Cent Present	Per Cent Found	Per Cent Error (Relative)
	Agerite Stalite	
1.00	1.00	0.00
	1.00	0.00
0.58	0.58	0.00
	0.58	0.00
0.28	0.27	3.57
	0.27	3.57
0.16	0.16	0.00
	0.16	0.00
		Avg. 0.89%
	BLE-25	
0.92	0.93	1.08
	0.92	0.00
0.57	0.58	1.75
	0.58	1.75
0.30	0.29	3.33
	0.32	6.67
0.17	0.17	0.00
	0.17	0.00
		Avg. 1.84%
	PBNA	
0.94	0.94	0.00
	0.94	0.00
0.67	0.68	1.49
	0.67	0.00
0.36	0.36	0.00
	0.36	0.00
0.18	0.17	5.56
	0.17	5.56
		Avg. 1.58%

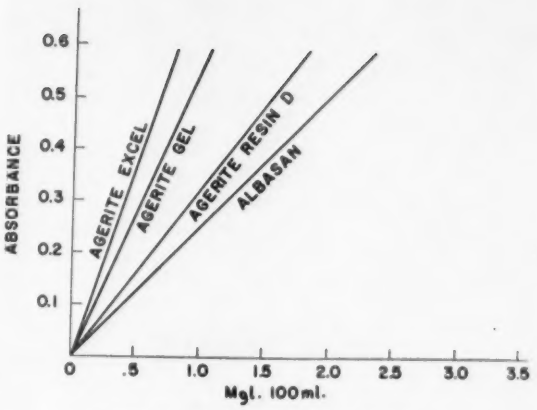


FIG. 10 — Conformity with Beer's Law.

Summary

A method is described for the qualitative identification and quantitative estimation of many of the more common amine antioxidants. The method is comparatively simple and requires less than one-half man hour per determination. The method is accurate and precise. Analyses with known stocks showed an average error of less than 2% relative.

ACKNOWLEDGEMENT

The author gratefully acknowledges the work of D. N. Pregler who carried out much of the experimental work described herein.

LITERATURE REFERENCES

(1) Bellamy, L. J., Lawrie, J. H., and Press, E. W. S., *Trans. Inst. Rubber Ind.*, Vol. 23, p. 15 (1947).
(2) Brock, M. J., and Louth, G. D., *Anal. Chem.*, Vol. 27, pp. 1575-80 (1955).
(3) Budig, K. H., *Kautschuk u. Gummi*, Vol. 1, pp. 177-81 (1948).
(4) Burchfield and Judy, *Anal. Chem.*, Vol. 19, p. 786 (1947).
(5) Craig and David, *Ind. Eng. Chem., Anal. Ed.*, Vol. 9, pp. 56-59 (1937).
(6) Deal, A. J. A., *Trans. Inst. Rubber Ind.*, Vol. 23, p. 148 (1947).
(7) Hamazaki, F. J., *J. Soc. Rubber Ind. Japan*, Vol. 23, pp. 302-06 (1950).
(8) Hively, R. A., et al, *Anal Chem.*, Vol. 27, pp.100-03 (1955).
(9) Kawaguchi, T., et al, *J. Soc. Rubber Ind. Japan*, Vol. 27 (1954).
(10) Koide, T., et al, *J. Soc. Rubber Ind.*, Vol. 22, pp. 108-12 (1949).
(11) Koide, T., et al, *J. Soc. Rubber Ind.*, Vol. 22, pp. 256-58 (1949).
(12) Mann, J., *Trans. Inst. Rubber Ind.*, Vol. 27, pp. 232-48 (1951).
(13) Mensik, P., and Broulik, D., *Rubber Chem. Tech.*, Vol. 29, p. 647 (1956).
(14) Morita, E., *J. Soc. Rubber Ind. Japan*, Vol. 26, pp. 259-64 (1953).
(15) Newell, J. E., Unpublished work (1951). Present address: Naugatuck Chemical Division, U. S. Rubber Company, Naugatuck, Connecticut.
(16) Parker, C. A., and Berriman, J. M., *Trans. Inst. Rubber Ind.*, Vol. 28, pp. 279-95 (1952).
(17) Zijp, J. W. H., *Recueil*, Vol. 75, p. 1155 (1956).

Determining Discoloration of Rubberlike Films by Reflectance Spectrometry

By JAMES T. HILL and FRED LEONARD

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THERE are two important sources for discoloration of elastomers and elastomeric compositions. They are contact with various staining agents and oxidative degradation. Rubberlike films which owe their flexibility to relatively high concentrations of liquid plasticizers are particularly sensitive to irreversible staining. That is, once the material is stained, it is extremely difficult, if not impossible, to remove the stain without destroying the surface of the film. Further, because of diffusion of plasticizer, the stain may migrate from its initial point of application and eventually spread throughout the film. This behavior is particularly noted in the case of plasticized polyvinyl chloride films containing relatively high concentrations of solvent-type plasticizers.

For those elastomers which do not require external plasticizers for rubberlike behavior, the resistance to irreversible staining appears to be dependent upon the solvent resistance of the material. More highly cross-linked films seem to have greater resistance to staining.

Note: This paper was presented before the Division of Rubber Chemistry, A.C.S., New York, N. Y., September 12, 1957.

Discoloration Due to Oxidative Degradation

Over-all yellowing and darkening due to oxidative degradation is observable with practically all lightly colored, rubberlike polymers. Unsaturated elastomers are most susceptible, and the phenomenon is also observable, although to a much lesser extent, with presumably completely saturated elastomers. In the latter case, oxidative attack could occur on a methylene hydrogen or on a hydrogen bonded to a tertiary carbon. Stabilizers and antioxidants serve to inhibit the effects of oxidative degradation for a time. However, inadvertent extraction of these protective materials during use, either by washing or rub-off, permits subsequent discoloration.

Elastomeric compositions used to date in cosmetic gloves worn by amputees over mechanical hands are no exceptions. They are as susceptible to discoloration as other materials, and in much the same manner as human hands, when exposed to stainants such as ball-point ink, lipstick or shoe polish. Since an elastomer having the regenerative powers of skin has not been found to date, a rubberlike material for cosmetic glove application should be inherently stain-resistant or have a high resistance to irreversible staining and to oxidative degradation over long periods of wear.

In order to attempt to develop materials with enhanced resistance to discoloration, investigation of different elastomers was undertaken. It appeared at the outset of this program that in order to be able to reproducibly grade materials in this respect, a quantitative method for describing discoloration should be developed.

A review of the literature indicated that early investigators used visual observations to qualitatively describe discoloration of rubberlike films in terms of changes in hue *(1,2)*. Later, Harrison et al *(3)* attempted to quantitatively describe discoloration, using a Photovolt photoelectric reflectance meter equipped with a green tristimulus filter.

Tramutt and co-workers *(4)* made reflectance measurements using four instruments — a Beckman DU spectrometer, employing a violet light beam (425 mμ); a photovolt photoelectric reflection meter, Model 610, equipped with a Model 610-Y search unit and a green tristimulus filter; a Welch Densichron reflection unit No. 3832A, equipped with a filter wheel providing several colored lights of relatively wide spectral bands; and a reflection gage consisting of a gray scale printed on a paper wheel. These authors indicated that of the four, the Welch instrument was found to be most

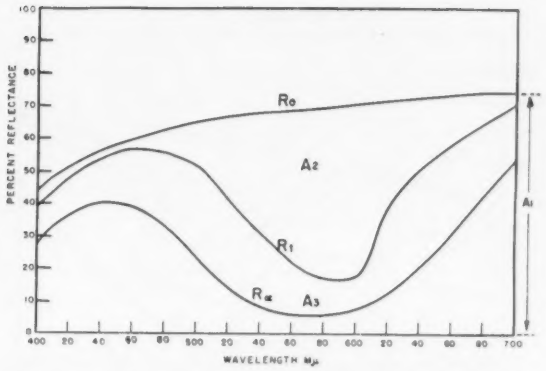

FIG. 1—Typical spectral reflectance curves for a plasticized polyvinyl film stained with ball-point ink.

practical. However, Tramutt et al further pointed out that, in general, actual color measurements are required to record and fully evaluate discoloration phenomena, and reflectance measurements are satisfactory for preliminary screening, but that they have the meaning of absolute value only if there is no significant change in hue.

Sanders *(5)* measured the light reflectance changes caused by exposure of vulcanized neoprene slabs at five different wave lengths in the visible spectrum, using a Beckman spectrophotometer. Sanders reported the curves obtained but indicated that reflectance measurements made at specific wave lengths could be used to measure yellowing. However, this author also indicated the possibility of erroneous interpretation based on reflectance measurements at a single wave length. Supporting evidence for this viewpoint will be cited later in this paper.

The present authors agree with Tramutt and his coworkers that actual color measurements are required to fully evaluate discoloration phenomena. One method for making such measurement quantitatively is to determine the complete spectral reflectance curve from 400 mμ to 700 mμ. From such curves, tristimulus values may be determined, and dominant wavelength, brightness, and purity for a given illuminant may be calculated *(6)*.

Further, by integrating the spectral reflectance curves obtained from differently treated samples, a method may be devised for determining per cent stain resistance and per cent discoloration due to oxidative degradation. The purpose of this paper is to present the method developed.

The Method

For measuring the resistance to staining, first, an unstained film is placed against a white background in the sample holder of a reflectance spectrophotometer. Spectral reflectance measurements are made over the visible spectrum, using a calibrated standard as reference. The film is then stained with a stainant. Reflectance measurements are again made of the stained film. The stained film is then cleaned with a solvent after definite time intervals, and final reflectance measurements are made.

Spectral reflectance curves, e.g., per cent reflectance versus wavelength, are drawn for all three conditions —unstained, stained, and cleaned sample. Typical curves for a plasticized polyvinyl chloride film stained with ball-point ink are shown in Figure 1. The area under the curve of the unstained sample (curve R_o) is designated A_1, the area between the unstained film and the cleaned film ($R_o - R_t$) is designated A_2, and the area between the curve for the cleaned film (R_t) and the stained film ($R\alpha$) is designated A_3.

The area ($A_2 + A_3$) is representative of the energy absorbed by the stained film. The area A_2 is representative of the amount of energy absorbed by the stain remaining after cleaning, and area A_3 is representative of the increase in energy reflected due to the removal of a portion of the stain. A quantity

$$\frac{A_2}{A_2 + A_3}$$

may then be defined as the fraction visible stain removed, or, stain resistance. Mathematically, the stain resistance may be expressed as follows:

$$\% \text{ S.R.} = \frac{\sum_{400}^{700} (R_t - R\alpha)}{\sum_{400}^{700} (R_o - R\alpha)} \times 100 \qquad (1)$$

For the determination of the per cent discoloration, the method was similar to that used for per cent stain resistance. Figure 2 represents spectral reflectance curves for material that had discolored. The curve Y_o is the spectral reflectance curve of the elastomeric film before discoloring, Y_t is the spectral reflectance curve of a sample heated to time "t", and Y_m represents the spectral reflectance curve of the sample heated to such a time to produce maximum yellowing.

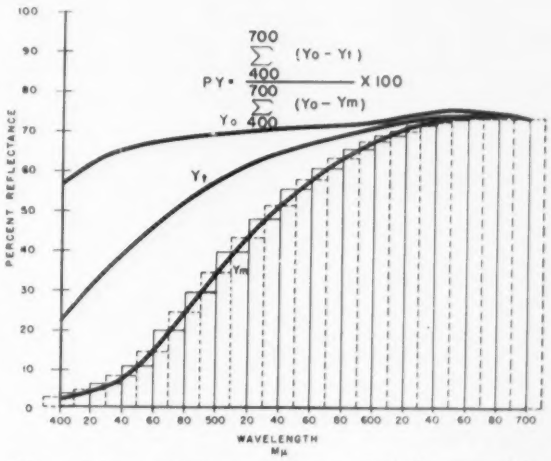

FIG. 2—Relative reflectance curves of a vinyl film exposed to heating.

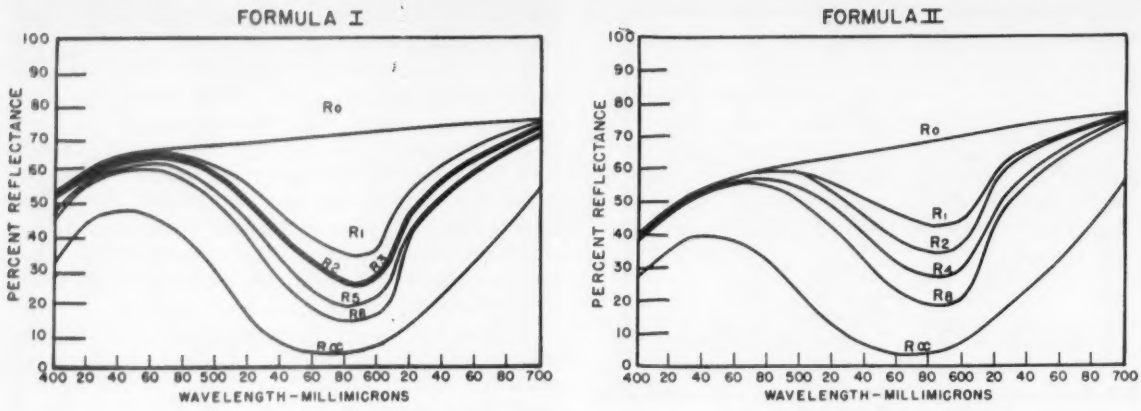

FIG. 3—Spectral reflectance curves of PVC films before staining, after staining and after cleaning.

The area between the curves Y_o and Y_t is representative of the amount of visible energy absorbed by the sample after having been heated to a time sufficient to produce a discoloration. The area between the curves Y_o and Y_m is representative of the amount of visible energy absorbed by the sample after having been heated sufficiently long to produce maximum yellowing. The per cent discoloration is defined as the ratio of energy absorbed by the sample at time "t" to the amount absorbed at maximum yellowing. Mathematically, this ratio may be expressed as:

$$\% \text{ Discoloration} = \frac{\sum_{400}^{700} (Y_o - Y_t)}{\sum_{400}^{700} (Y_o - Y_m)} \times 100 \qquad (2)$$

In Figure 2, it is observed that the total areas enclosed by the solid and broken lines are equal. This affords a more rapid method of graphical integration. The relative areas under curves Y_o, Y_t, and Y_m may be determined by adding the reflectance readings from 420 mμ to 680 mμ at 20 μ intervals to one-half the reflectance values at 400 mμ and 700 mμ, respectively.

Another term, per cent degradation, may be defined in which Y_m is set equal to zero, e.g., for the case in which a specimen has been heated to a non-reflecting black. Under these conditions

$$\% \text{ Degradation} = \frac{\sum_{400}^{700} (Y_o - Y_t)}{\sum_{400}^{700} Y_o} \times 100 \qquad (3)$$

Experimental Procedure

The elastomeric composition used to develop the method for quantitatively determining the discoloration of elastomers was plasticized polyvinyl chloride (PVC). This was used because commercially available gloves are fabricated from PVC plastisols, and it could thereby serve as a basis against which improved elastomers may be compared. The following PVC plastisols were compounded:

Formulation I*

	Grams
Geon 121	500.0
Di-2-ethyl hexyl phthalate	465.0
Stabilizer BC-105	5.2
Stabilizer C-77	14.9
Stabilizer E-49	14.9
Titanox RCHT-X Dispersion (50% in Paraplex G-60)	0.5

Formulation II

Geon 121	452.0
Di-2-ethyl hexyl phthalate	148.0
Paraplex G-62	148.0
Dioctyl sebacate	148.0
Stabilizer XBC-30	14.8
Titanox RCHT-X Dispersion	0.5

To form the plastisol, the ingredients were milled on a 3-roll ink mill, using tightly spaced rolls, and then the plastisol was placed under vacuum to remove occluded air. Films were prepared according to the following: The cylinder (2-inch diameter x 7-inch height) was filled with plastisol and immersed in boiling water for 30 seconds. Excess plastisol was poured back into the masterbatch. The cylinder was then set upside down in a circulating air oven at 50°C. for 20 minutes to permit residual, ungelled plastisol to drain. The cylinder was next placed in a circulating air oven at 177°C. for 15 minutes. The cylinder was removed from the oven, allowed to cool, the PVC film was removed and cut into a flat sheet. This processing resulted in films about 40 mils thick.

Circular areas were stained with oil-soluble ball-point ink and lipstick by finely cross-hatching an area one inch in diameter and uniformly spreading the stain with a finger.

The stains were cleaned by wiping the stained area rapidly with clean pieces of felt saturated with a solvent mixture, 1:1:1, of isopropyl alcohol, dichloroethylene and methyl ethyl ketone. It was found that a cleaning cycle of one minute was sufficient to remove most of the removable stain. To insure a factor of safety, a two-minute cleaning cycle was used.

*Manufacturer's Reference: Geon 21, B. F. Goodrich; Stabilizers, Advance Solvents and Chemicals; Paraplex, Rohm & Haas; RCHT-X, Titanium Pigment.

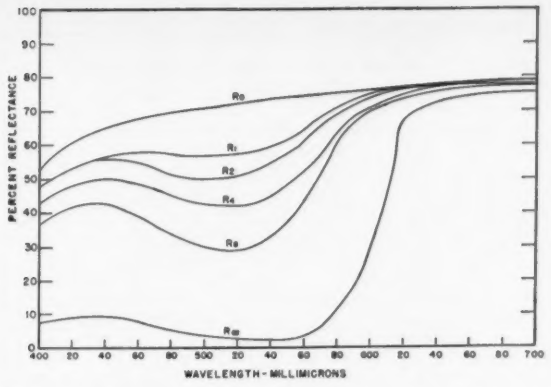

FIG. 4—Reflectance curves of vinyl materials stained with lipstick.

Discoloration Due to Oxidative Degradation

To prepare a standard yellow sample, a vinyl film (Formula I) was heated in a natural convection oven for from 0 to 165 minutes at an oven temperature of 170 ± 2°C. Samples were removed from the oven at 15 minute intervals. The samples were observed visually for the amount of yellowing, and the sample which exhibited the yellow of highest purity was designated as a maximum yellow sample. By this method it was determined that the sample heated for 75 minutes was most yellow.

Reflectance measurements were made at 20-millimicron intervals between 400 and 700 millimicrons, using a Beckman Model DU spectrophotometer equipped with a reflectance head. The sample was measured against a white background whose average reflectance was 77%. A Vitrolite tile (average reflectance, 85%) was used as a standard. In order to calculate tristimulus values, the reflectance values obtained, using the Vitrolite standard, were converted to values based on magnesium oxide as a standard. The comparison of stain resistance of the test film and control film to ball-point ink and lipstick was determined for 1, 2, 4 and 8 hours of stain exposure.

Significance of the Method

In order to establish the limit of uncertainty of the method, the estimated standard deviation was determined. Ten areas of a film from the test plastisol were used for the determination. One area was used for unstained reflectance measurements and the other nine areas were stained with ball-point ink.

Reflectance measurements were made of all the stained areas. After eight hours, the stains were cleaned with the solvent mixture. Reflectance measurements were made of the cleaned areas and the per cent stain resistance calculated (Equation 1). The universal estimated standard deviation was calculated from the data in the usual manner. The mean stain resistance was found to be 49.8%, and the estimated standard deviation, 1.775. Using a 2σ value for the 95% probability level, it was indicated that the method for determining stain resistance in this region of stain resistance is reproducible to ± 3.55%.

Results and Discussion

To determine the stain resistance of Formula I PVC film and Formula II PVC film to ball-point ink, the spectral reflectance curves of films before staining, after staining, and after cleaning were determined. The data are plotted in Figure 3. Curves R_0 represent the spectral reflectance curves of the unstained sample, and curves R_1 to R_8 represent the spectral reflectance curves of films which had been stained for 1 to 8 hours prior to attempts to remove the stain. Curves $R\infty$ represent the initially stained film.

Calculations of the stain resistances according to Equation 1 are given below:

Hours of Staining	% Stain Resistance
Formula I	
0	100.0
1	66.0
2	58.4
3	55.4
5	48.1
8	43.7
∞	0.0
Formula II	
0	100.0
1	79.0
2	72.0
4	61.4
8	52.2
∞	0.0

These data indicate that the longer the stain remains in contact with the film, the more difficult it is to remove. The results also show that the vinyl film from Formula II has a higher stain resistance than the film from Formula I, probably indicating that the rate of diffusion of the stain into the Formula I film is greater than the rate into the Formula II film.

These curves illustrate the importance of measuring the complete visible spectrum for proper evaluation of staining. If these stains were measured in the blue region only, the conclusions would be that the film was highly resistant to the stain. If the measurements were made in the yellow region, the opposite conclusions would be drawn, e.g., the film had very little stain resistance.

The following example will illustrate this point. Assume that the per cent stain resistance for eight hours of staining of Formula II is to be determined by reflectance measurements at one of the following three wave lengths: 470mμ, 580mμ or 650mμ. Using the stain resistance formula (Equation 1) without the wave length summations, the following per cent stain resistances were determined: $S.R._{470} = 86\%$, $S.R._{580} = 25\%$ and $S.R._{650} = 87\%$. Compare these values with the determined S.R. of 52%, using the total energy reflected in the visible spectrum.

In Figure 4 are plotted similar curves for PVC samples (Formula II) stained with lipstick. These curves also illustrate the need for complete visible

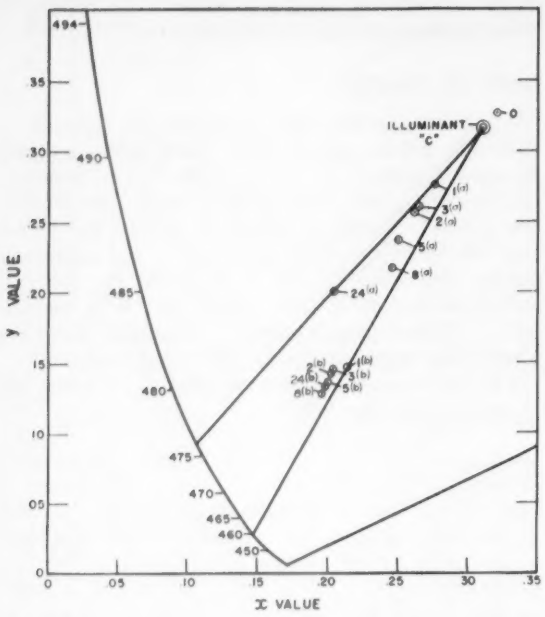

FIG. 5—Chromaticity diagram for film stained with ball-point ink (b = before cleaning, a = after cleaning).

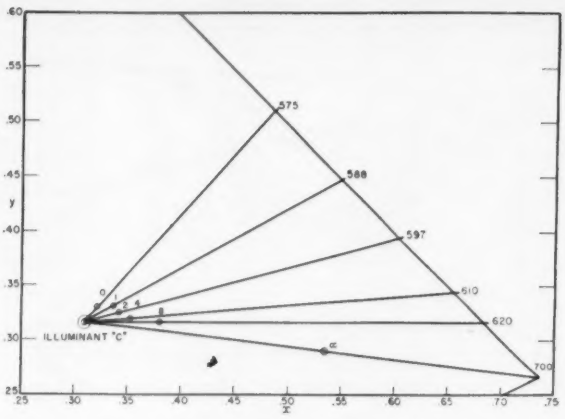

FIG. 6—Chromaticity diagram for film stained with lipstick.

spectrum reflectance measurements to properly evaluate the lipstick staining. Measurements in the blue region would lead to the conclusion that the film was less resistant to staining than is the actual case. Measurement in the red region of the spectrum would lead to the opposite, erroneous conclusion. The calculated stain resistance for varying times of contact of the lipstick with the vinyl film prior to attempts at removal is shown below:

Hours of Staining	% Stain Resistance for Lipstick	% Stain Resistance for Ball-Point Ink
0	100.0	100.0
1	85.7	79.0
2	82.0	72.0
4	70.1	61.4
8	57.0	52.2
∞	0.0	0.0

The data show that, like the ball-point ink stain, the lipstick stain becomes more difficult to remove as the time of contact is permitted to increase. However, comparison between the per cent stain resistance for the lipstick and the ball-point ink indicates that the PVC film is more resistant to staining by the lipstick, presumably because of lower solvation of the film by the lipstick dispersant than the ball-point ink dispersant and slower diffusion of the lipstick stainant into the PVC film. The quantitative results are in accord with visual observation.

From the spectral reflectance curves of Figures 3 and 4, tristimulus values (X,Y,Z) and trichromatic coefficients (x,y) were calculated according to the method of the ten selected ordinates *(6)*. These data are summarized in Tables I and II. From the calculated trichromatic coefficients, chromaticity diagrams were plotted (Figures 5 and 6) and dominant wave length, brightness, and purity, based on Illuminant C as the light source, were determined for the films stained with ball-point ink and lipstick.

Referring to Figure 5, it may be observed that the samples before cleaning had a higher purity than after cleaning and varied in dominant wavelength between 459 and 464 millimicrons. After cleaning, the domi-

TABLE I—CHROMATICITY VALUES OF FILMS STAINED WITH BALL-POINT INK

	Before Cleaning — Hours Stained						After Cleaning — Hours Stained						
Value	1	2	3	5	8	24	0	1	2	3	5	8	24
X	0.160	0.150	0.148	0.134	0.130	0.131	0.598	0.401	0.355	0.350	0.300	0.276	0.194
Y	0.1095	0.105	0.1045	0.090	0.084	0.0875	0.613	0.398	0.349	0.342	0.282	0.241	0.190
Z	0.482	0.484	0.472	0.446	0.447	0.440	0.668	0.648	0.647	0.629	0.612	0.598	0.564
x	0.213	0.203	0.204	0.200	0.197	0.199	0.319	0.277	0.263	0.265	0.251	0.2475	0.205
y	0.146	0.142	0.144	0.134	0.127	0.133	0.326	0.275	0.258	0.259	0.236	0.216	0.200
Dominant Wavelength	459	464	464	463	462	463	576	473	473	473	471.5	464.5	476
Brightness	10.95	10.5	10.45	9.0	8.4	8.75	61.3	39.8	34.9	34.2	28.2	24.1	19.0
Purity	59.00	62.0	62.00	65.0	67.0	65.00	5.0	17.0	24.0	23.5	32.0	36.0	52.0

TABLE II—CHROMATICITY VALUES OF FILMS STAINED WITH LIPSTICK AFTER CLEANING

Value	Hours Before Cleaning 0	1	2	4	8	∞
X	0.621	0.582	0.567	0.526	0.494	0.224
Y	0.637	0.567	0.536	0.474	0.410	0.121
Z	0.673	0.576	0.553	0.488	0.396	0.074
x	0.322	0.337	0.392	0.353	0.380	0.535
y	0.330	0.329	0.324	0.319	0.315	0.289
Dominant Wavelength	575	588	597	610	620	700
Brightness	63.7	56.7	53.6	47.4	41.0	12.1
Purity	6.5	10.5	10.5	12.0	18.0	53

nant wavelength shifted toward the yellow region of the spectrum. This shift is to be expected as the blue stain is removed and the spectral reflectance characteristics of the film itself contribute more to the spectral characteristics of the stained film.

The dominant wavelength for the sample which was stained for 24 hours before attempts were made to remove the stain cannot be explained in the light of the other results, and is probably due to experimental error. The brightness and purity values indicate that the longer the stain remains in contact with the film prior to attempted removal, the less successful is its removal. For example: the brightness value falls from 39.8 to 19.0 for 1 to 24 hour contact before cleaning, and the purity value rises from 17 to 52 for the same time periods.

In Table II are summarized the tristimulus values and the trichromatic coefficients calculated for the lipstick-stained samples. Using these values, a chromaticity diagram was plotted (Figure 6) and the dominant wavelength, brightness, and purity values in the table computed. It is observed that as the time before cleaning the stain from the sample is increased, the dominant wavelength increases toward the red end of the spectrum, indicating less removal of the stain. As in the case of the ball-point ink stains, the more complete the removal of the stain, the greater is the contribution of the spectral characteristics of the film itself to the characteristics of the cleaned film. The purity and brightness values are indicative of the same conclusion, e.g., the brightness values decrease as the time of contact before cleaning is increased, and the purity values increase. These data are in accord with the calculated per cent stain resistance.

For determining the per cent discoloration due to oxidative degradation, it was first necessary to set up a standard for maximum yellowing. This was done by heating a series of plasticized PVC films (Formula I) at 170 ± 2°C. in an oven for definite time periods and measuring the spectral reflectance characteristics of the samples in the usual manner. The curves are shown in Figure 7.

It is seen that the curves for a film heated for 0 to 15 minutes are parallel. This indicates that heating the sample up to 15 minutes has not caused it to start to yellow but simply caused a slight darkening. Actually, examination of Figure 8 and Table III indicates that the dominant wavelength, based on Illuminant C for the 15 minute sample, has shifted toward the shorter wavelength (toward the green) region of the spectrum, and is not at all indicative of an increase in yellow, as one would be forced to conclude if measurement were made at a single wavelength or a wavelength band in the blue region.

Interestingly enough, even between the 15- and 30-minute samples, where a marked difference in reflectance in the blue region has occurred, the dominant wavelength has increased only by one wavelength unit, indicative of only a slight shift toward the yellow of longer wavelengths. However, in this instance, the purity increased from 5.5% to 17%. These data further indicate that the interpretation of the results obtained through the use of reflectance values measured at a single wavelength or a single wavelength band as a change in hue, could be erroneous. It seems, therefore, that in order to fully evaluate discoloration phenomena, actual color measurements, e.g., complete spectral curves, appear to be required.

Sanders *(5)* also showed that false conclusions concerning yellowing could be made by measuring reflectance only at one wavelength. He cited an example of yellowing caused by an increase in the reflectance in the green and red portions of the spectrum rather than by a decrease in reflectance in the blue. Measurements at 4570Å might have led to the false conclusion that the sample became whiter. This further emphasizes the importance of determining the complete spectral curves in the visible range. However, in the 30-minute sample there is evidence of absorption in the blue region, indicating that sample yellowing has occurred.

From the curves, the trichromatic coefficients were calculated, the chromaticity diagram plotted (Figure 8), and the dominant wavelength, purity and bright-

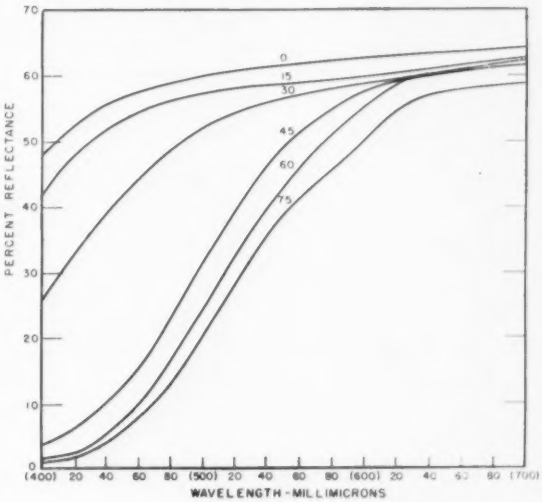

FIG. 7—Spectrophotometric curves of yellow standards.

TABLE III—YELLOWING OF ELASTOMERIC FILMS BY HEATING AT 170°C.

Standard Number	Heating Time (Min.)	Tristimulus Values			Tristimulus Coefficients		Dominant Wave-length	Purity (%)	Brightness (%)
		X	Y	Z	x	y			
0	0	0.598	0.613	0.668	0.319	0.326	576	5.0	61.3
1	15	0.570	0.585	0.624	0.319	0.329	573	5.5	58.5
2	30	0.537	0.561	0.498	0.337	0.352	574	17	56.1
3	45	0.464	0.483	0.173	0.414	0.432	576	59	48.3
4	60	0.426	0.432	0.109	0.442	0.447	578	70	43.2
5	75	0.387	0.387	0.084	0.451	0.451	578	74	38.7

ness calculated. The data are summarized in Table III.

It is observed from the diagram (Figure 8) that from 0 to 75 minutes the dominant wavelength shifts toward 578 mμ, a bright yellow. The purity also increases from 5 to 74%. However, it may be noted that between 60 and 75 minutes the dominant wavelength remains constant at 578 mμ, but maximum purity at this wavelength is attained at 75 minutes. Between 75 and 120 minutes, the dominant wavelength increased markedly to 600 mμ, a definite shift toward the red, and the brightness decreased, indicative of severe sample degradation. The 120-minute sample appeared visually to be a dark, reddish orange, whereas the 75-minute sample was a bright yellow. The 75-minute sample was used as the maximum discoloration sample.

The calculated per cent discoloration and degradation values, determined according to Equations 2 and 3, are shown below:

Time	% Discoloration	% Degradation
0	0.0	0.0
15	10.6	4.7
30	29.8	13.1
45	71.1	31.0
60	87.4	38.2
75	100.0	44.0
120	——	88.8

The data indicate that as the sample is heated from 0 to 75 minutes, the per cent discoloration increases from 0 to 100%. Based on the arbitrary selection of a non-reflecting black as the maximum degradation sample, the per cent degradation increases from zero to approximately 89%.

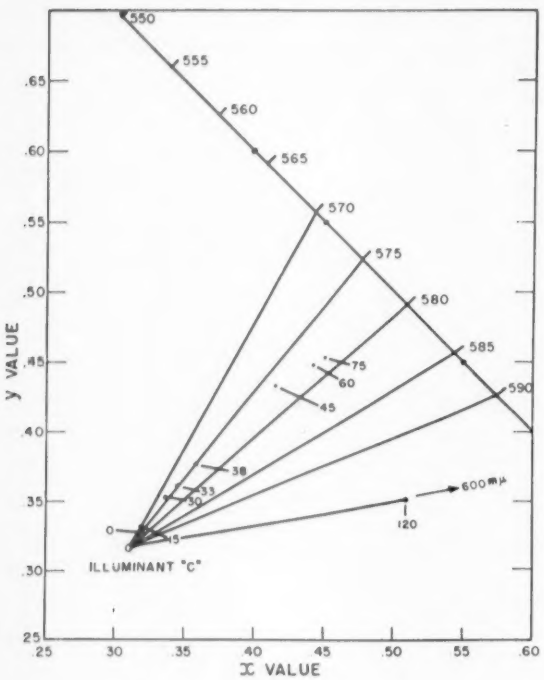

FIG. 8—Chromaticity diagram of yellow standards.

Summary

A method has been developed for determining the discoloration due to staining and degradation of elastomeric film, using reflectance spectrometry. The method is consistent with visual observations and has the advantage that the effects may be quantitatively described and recorded for later use. The importance of using the complete spectral reflectance curve for use in interpretation of discoloration phenomena is emphasized. Examples of erroneous interpretations of staining and discoloration results, based on single wavelengths or wave-band measurements, are illustrated.

Although this preliminary work has been limited to plasticized polyvinyl chloride films, the method is equally applicable to natural and synthetic elastomers where staining by a variety of staining agents and discoloration due to oxidative degradation is a problem.

LITERATURE REFERENCES

(1) Moses, F. L., and Rodde, A. L., *India Rubber World*, Vol. 119, p. 201 (1948).
(2) Haworth, James, and Pryer, W. R., *Trans. Inst. Rubber Ind.*, Vol. 25, p. 265 (1949).
(3) Harrison, T. B., Labbe, B. G., and Clibourn, R. M., *Rubber World*, Vol. 134, p. 64 (1956).
(4) Tramutt, H. M., Anderson, E. G., Rostler, F. S., and White, R. M., *Ind. Eng. Chem.*, Vol. 49, p. 1238 (1957).
(5) Sanders, P. A., *Rubber Chem. Tech.*, Vol. 22, p. 465 (1949).
(6) Hardy, A. C., Chapter IV, "Handbook of Colorimetry," Technology Press, Massachusetts Institute of Technology (1936).

Temporary Bonding of Nylon to Rubber

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A bonding method which permits complete separation of fabric and elastomer by washing in warm water

THIS article covers one phase of a larger project conducted for the Air Force on space suits. In the authors' opinions, the approach as well as the final solution present some unusual aspects not encountered in conventiontal development projects. The over-all objective was to develop a rubberized cloth which would meet fabrication and use requirements for space suits. The procedural details are as follows:

(a) Distortion of the normal weave to give a bias effect to nylon fabric.

(b) Sizing of the cloth to stabilize and "lock in" the bias structure.

(c) Rubberizing with a suitable compound to give good nylon adhesion and provide desirable characteristics for an inflatable suit.

(d) Tailoring the garment.

(e) Development of a method to completely separate the elastomer film from the textile backing to allow independent movement of the two plies in the finished garment.

Through the cooperation of the Textile Engineering Research Division, United States Rubber Co., a nylon fabric distorted from the ordinary 90° x 90° yarn angle relationship to 110° x 70° was made available. Its properties are listed in Table I.

This bias fabric is reasonably stable, but WADC requested additional treatment for greater immobility. In addition, the cloth was to be tailored and the yarns tend to slough off the slippery weave at cut edges unless sized.

For the second step, an impermeable elastomeric compound was to be selected for bonding to the nylon. This compound has to meet a number of requirements, including ozone resistance. The compound was to be spread coated, calendered or laminated to the base fabric from which the flight suit was then to be tailored. The finished garment was then to be washed, either in water or in non-flammable solvent, whereupon the sizing agent was to be completely removed, releasing the bond between the elastomeric film and the underlying fabric. Two separate plies, one "floating" within the other, would result.

During the course of this work it was found that Supranyl, a standard nylon finishing agent, would meet the requirements for both the sizing and bonding agent. Samples of nylon were dipped in a solution of Supranyl (Stein, Hall Co., New York, believed to be a modified acrylic acid), dried and the pick-up of the cloth measured. Then the swatches were washed

Note: This research was supported in whole or in part by the United States Air Force under Contract AF 33(616)—5121, monitored by the Materials Laboratory, Wright Air Development Center, Wright-Patterson Air Force Base, Ohio.

TABLE I—NYLON FIBERTHIN S/1103 FABRIC

Yarns: 210 Denier Nylon

	Greige	Racked 22°
Width (in.)	43⅜	37
Ozs./sq. yd.	2.33	2.79
Ends/in.	40	47
Picks/in.	40	43
Gauge (in.)	.0055	.0065
Warp Crimp (%)	1.2	0.4
Filling Crimp (%)	2.2	4.0
Warp Strength (lb.)	184	214
Filling Strength (lb.)	182	210
Air Permeability	90	53
Max. Eff. Stretch (%)	30	60

TABLE II—WEAVE STABILIZATION OF S/1103 NYLON, RACKED 22°

Treatment: Supranyl

Property	Value	Unit
Solution solids	5.0	%
Pick-up on dipping	0.18	oz./sq. yd.
	6.0	%
Size remaining after washing	.0085	oz./sq. yd.
	0.4	%
Force to pull yarn:		
Before sizing	0.0	lb.
After sizing	7.5	lb.
Stiffness*	1.0	—

*0 = limp, 3 = stiff.

TABLE III—PHYSICAL PROPERTIES OF SUCCESSFUL BUTYL RUBBER STOCK

FORMULA

	Parts
Butyl Rubber 035	100
HPC Black	50
Zinc Oxide	5
Stearic Acid	2
Anti-Sun Wax	4
Sulfur	2
TMTDS	1
MBTS	1

Cure @ 305°F.	M_{100}	M_{200}	M_{300}	M_{400}	T_b	E_b	Shore A
30 min.	150	300	550	850	1900	650	62
60 min.	200	455	810	1210	1960	570	63
90 min.	245	540	860	1360	2020	550	63

for ten minutes in 150°F. water with gentle agitation in a portable washing machine, dried and weighed once again to determine the amount of size remaining. Weave stabilization was measured by placing cut strips in a Scott tensile machine equipped with hooks which were looped through the strips ½-inch from each end and the yarns pulled out. Data are given in Table II.

Other commercial blends of modified polyacrylic acid, such as Nopcosize N (Nopco Chemical Co.) and Acrysol A-1 (Rohm & Haas Co.) were useful for weave stabilizing, but varied in their ability to wash clean. Acrysol A-1 especially tended to insolubilize by the heat later applied during vulcanizing of the elastomer and would not wash out.

Butyl Rubber Stock Used

Since ozone resistance is a requirement of the elastomer, preliminary work was conducted with neoprene and butyl rubbers. At the present stage of development butyl rubber best meets the requirements. Uncured neoprene applied to the cloth bonds tightly, but does not release on washing. Precured neoprene does not bond. It is believed that an intermediate partial state of cure could be found which would meet the bonding requirements, but this point has not yet been exactly determined.

The stock successfully used and its physical properties are given in Table III.

In order to screen out quickly the many variables of sizing agents, polymers, detailed formulation, state of cure, and others, it was decided to use the following bonding method: The compound was calendered to a gauge of approximately six mils, and used either unvulcanized or pre-cured four hours at 300°F. in a circulating hot air oven. Sandwich constructions consisting of alternating layers of rubber and sized nylon were built up, placed in a heated hydraulic press and laminated at five psi. Ten minutes at 250°F. was used for the pre-vulcanized compounds, and 45 minutes at 305°F. was used for unvulcanized compounds.

Some experiments were also made in which the elastomer was calendered directly to the pre-treated nylon and then vulcanized in roll form. The results with both methods of lamination were comparable.

The adhesion between the elastomer and the nylon plies was evaluated by cutting 1-inch strips and measuring the bond strength with a Scott tensile machine. Alternate samples were placed in the washer with 150°F. water and washed for ten minutes and the drop in bond strength was again measured.

With neoprene and commercial nylon sizing agents a bond strength of five pounds per inch of width was obtained. This strength showed no change on washing. These values, for a system inherently difficult to adhere, are of sufficient interest to warrant further study with latex and other aqueous specific adhesive systems for nylon. The butyl rubber compound with the Supranyl sizing agent exhibited the reversible adhesion desired. Data are given below for press laminated adhesions:

Sizing Agent	Supranyl
Concentration	5%
Cloth	S/1103 Nylon
Condition: Uncured	
Adhesion before washing	3.5 lb./in.
Adhesion after washing	0 lb./in.
Condition: Cured	
Adhesion before washing	2.5 lb./in.
Adhesion after washing	0 lb./in.

The adhesion after washing is shown as zero since the fabric and rubber fell apart in the washer during the washing cycle.

The foregoing information illustrates a method whereby temporary adhesion may be obtained between nylon and an elastomer, and that complete separation of the two layers after vulcanization will occur by washing in warm water. This method opens a new avenue of rubber product manufacture.

High Temperature Resistance of Polymer-to-Metal Bonds

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Previous concepts of heat resistance of elastomer-to-metal assemblies have been raised appreciably

WITH the development of certain fluorine-bearing elastomers, as well as a new curing system for butyl rubber, both of which led to development of elastomeric stocks having exceptional resistance to high temperature exposures as compared to previously available organic materials, there was brought to the authors the question of whether such compositions could be bonded to metals, with the bonds able to withstand the type of high temperature service for which the stocks were developed. Test assemblies were prepared to evaluate such elastomer-to-metal bonds, a number of experimental bonding agents were used in making such bonds, and the test assemblies were exposed to the temperature environments required. It was concluded that such bonds are feasible.

Mention should be made that we have not attempted to prepare a rigorous study of the problems here touched upon, but only to report results of certain comparative trials on stocks evaluated. However, many of these data have been confirmed subsequent to first observation, in some cases by functional tests on actual parts, and correlative observations have given us additional confidence in some of the isolated data.

Test Methods

The test methods involved were based upon two tests, both described first in commercial literature (Thixon Newsletter No. 1), both being approximate in nature, yet capable of developing considerable information about a bond. The basic test method employed was a cut-and-strip test method, similar in theory to ASTM D-429-55T Method B.

The other test method, termed the "Adhesion Distention Test," was also quite useful in evaluating the bonding systems which were studied in this work. The latter test assembly comprised two pieces of steel (or alternatively other metal), each approximately 3 x 1 x 3/16-inch in size, bonded during press cure to the elastomer stock, so that the finished molding comprised a sandwich of two pieces of steel with compound bonded between them. Twenty-four hours after molding, one plate of the assembly was drilled and tapped with ¼-inch thread, so that a bolt could be screwed into the one plate, down to touch the other plate. With tightening of the bolt, the lower plate was forced away from the other, creating a sustained tension on the two bonded areas. Two complete assemblies, one before and one after distention, are shown in Figure 1.

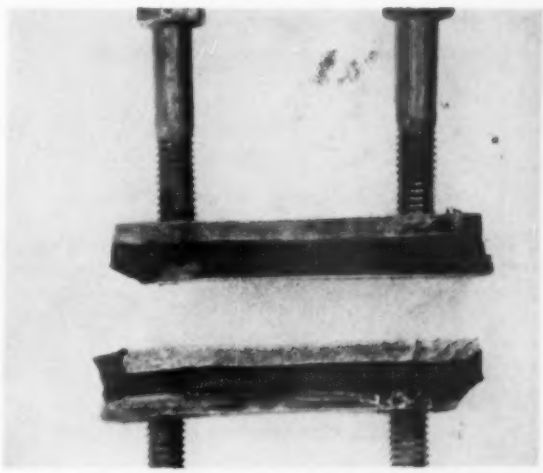


FIG. 1—Two distention assemblies, one before distention (top) and one after (below).

Note: This paper was presented before the Division of Rubber Chemistry, American Chemical Society, at Cincinnati, Ohio, May 15, 1958.

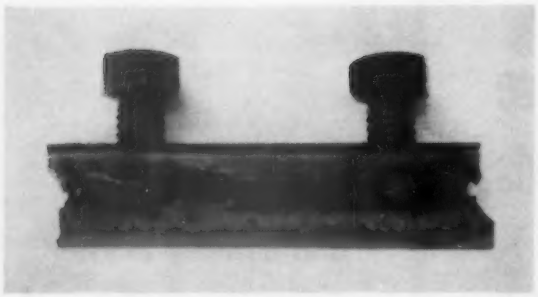


FIG. 2—Separated bars of a distention assembly after test and separation, showing good bond.

Two screws are usually used per assembly, and the two metal plates remain parallel as they are separated due to balanced tension. The bolts may be turned with a torque wrench to a definite tension, or the plates may be separated a known distance in terms of percentage elongation of the stock. In our work, we estimated 50 and 100% elongation. These small assemblies can then be subjected to any desired environment—heat, oil, hot immersions, etc.—while distention is maintained. They are inexpensive to prepare, they maintain a relatively large stress on the bond, and they can be readily handled in quantities. In our laboratory, we have in the past used such distended assemblies in roof weathering tests, oven tests, boiling water tests, and others, in quantities which were completely out of the question with older techniques, in which bulky clamps and devices were used to separate conventional motor mountings or ASTM tension test buttons.

After the exposure, the parts were examined for bond failures. Figure 2 shows a test assembly broken apart after test on a relatively good bond. If such bonds are apparently sound over a large part of the area, the test results are more significant. Tests with greater rupture or bond failure areas presumably have diminished distention over an indeterminate period of exposure time. Figure 3 shows two bars on which the bond failed over a large part of the bonded area; in this case, we assume less bond stress than that exerted on first piece shown. The piece is evaluated by observation, with an estimate made of the per cent area metal showing, the per cent area cement showing, and the difference from 100% is termed stock failure.

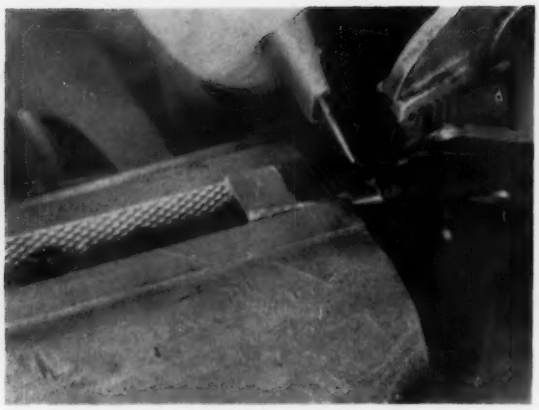


FIG. 4—Cut-and-strip test being run on a bar after curing.

For the cut-and-strip test, we used a single insert of the same dimensions as above, and molded rubber in contact with the cemented metal to reach an overall thickness of ½-inch after molding. The day after the bond was made, the metal was fixed in a vise, and the stock pulled in an attempt to strip it from the metal. This operation is shown in Figure 4.

If the bond is good, the stock starts to tear when pulled away from the metal slowly at an angle of perhaps 45° from the still-bonded stock. As tearing occurs, a knife cut is made to bring the test line back to the metal surface. Repeated tears and cuts are made, always being sure that some tearing occurs

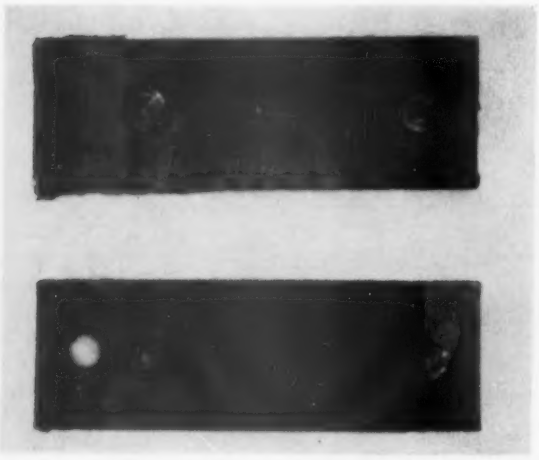


FIG. 3—Separated bars of a distention assembly after test and separation, showing poor bond.

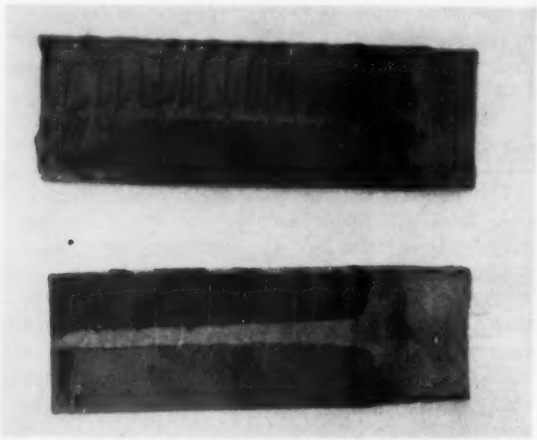


FIG. 5—Two bars after completion of cut-and-strip test.

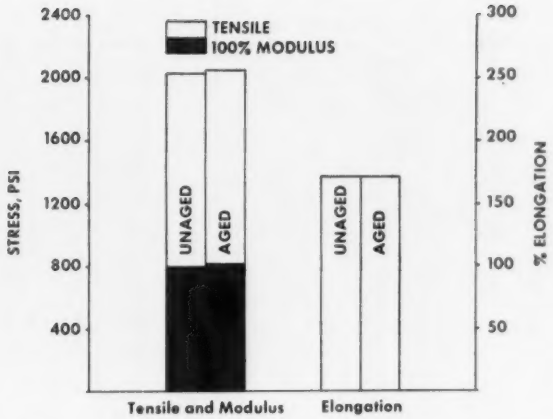


FIG. 6—Stress-strain data of a Viton A compound (aging = 72 hours at 400°F. in an air oven).

before the knife is re-introduced. The bond is evaluated in terms of estimated area of metal showing after the test, area of cement showing, and residual area of stock failure. Two test pieces used in getting the data that follow are shown in Figure 5.

Tests of Fluorinated Rubber

In this work the fluorinated polymer stock used was based on Viton A, the composition being:

	Parts
Viton A	100.0
Genmag Technical	20.0
MT Carbon Black	25.0
HMDA Carbamate	1.3

This stock had physical properties as shown in Figure 6, after cure of 30 minutes at 300° F. plus post-cure of 24 hours at 400° F. After additional temperature exposure of 72 hours at 400° F., the properties of this stock were virtually unchanged, as seen in the graph.

After preliminary elimination, two different bonding systems were employed for the experimental

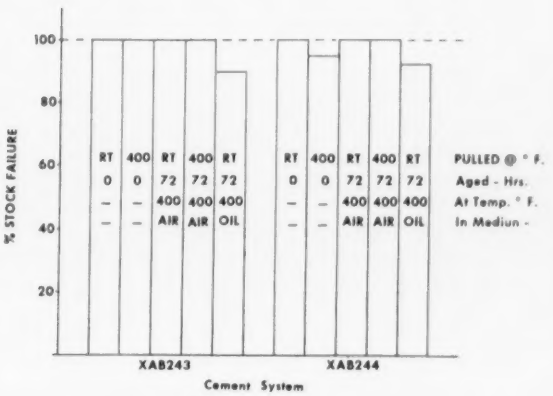


FIG. 7—Strip aging tests of a Viton A compound.

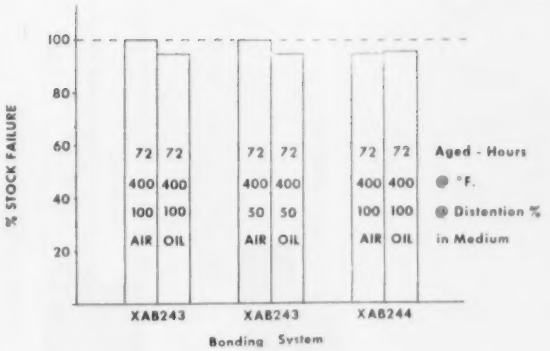


FIG. 8—Distention aging tests of a Viton A compound.

Viton A adhesion work. The adhesion test assembles of this stock for the cut-and-strip test were bonded to steel with an initial cure of 30 minutes at 300° F. and then subjected to a post-cure of 24 hours at 400° F. One-third of the area was pulled cold, whereupon the piece was again heated to 400° F. for one hour, and the balance of the piece pulled while hot, immediately after removal from the oven.

Results obtained with two different bonding systems are detailed in Figure 7. Also, in the same figure, it is seen that 72 hours heat aging at 400° F. in a circulating air oven on similarly prepared pieces had little effect on their adhesion, and these aged pieces also showed good pulls when pulled hot. Also, when pieces were exposed to hot synthetic lubricating oil for 72 hours at 400° F., only slight loss of adhesion was noted. In fact, it did appear that the bond was somewhat better than the stock in this environment, as will be shown later. The oil used was Turbo Oil No. 3, believed to be a sebacic acid ester.

Adhesion distention bar assemblies were then prepared, and these were placed under tension with approximately 50 and 100% elongations, then put

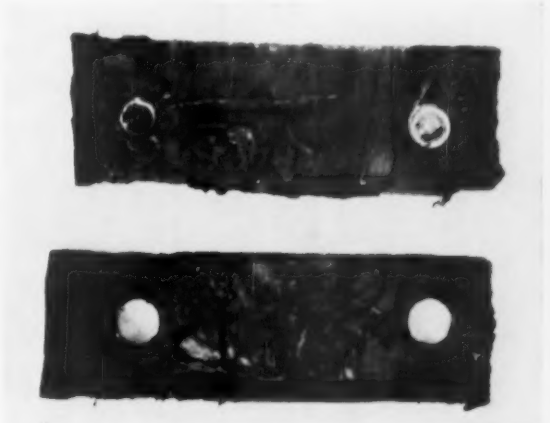


FIG. 9—Adhesion distention assembly after exposure to hot oil during distention, showing adhesion in excess of stock strength.

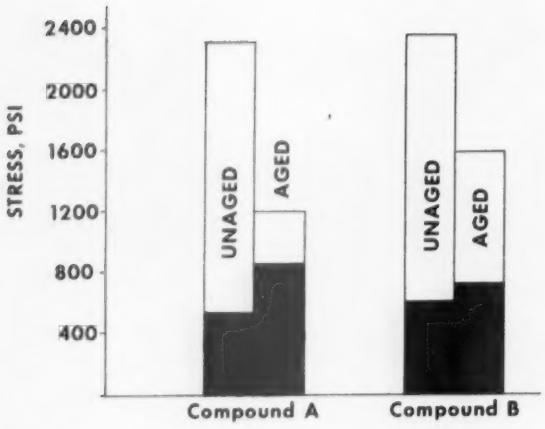


FIG. 10—Stress-strain data of two heat-resistant butyl rubber compounds—white = tensile, black = 100% modulus (aging = 8 hours at 400°F. in circulating air oven).

into a circulating oven for 72 hours at 400° F. The bars had been given the same cure and post-cure as the earlier samples. Another set was placed in Turbo Oil No. 3 at the same temperature, for the same length of time. After removal from the oven, the pieces were cut apart, and pulled and cut to yield results as detailed in Figure 8. In this diagram, we see side-by-side comparisons of hot-air-aged and hot-oil-aged distention bars, using two different adhesion systems and two different degrees of distention. There was very little cement or metal failure in any case, all failures observed being very nearly 100% rubber rupture. A distention assembly, as removed from the hot oil, showing nearly 100% rubber rupture, is shown in Figure 9.

Tests of Butyl Rubber

A similar group of tests were run on some high temperature butyl stocks. Most of these stocks came

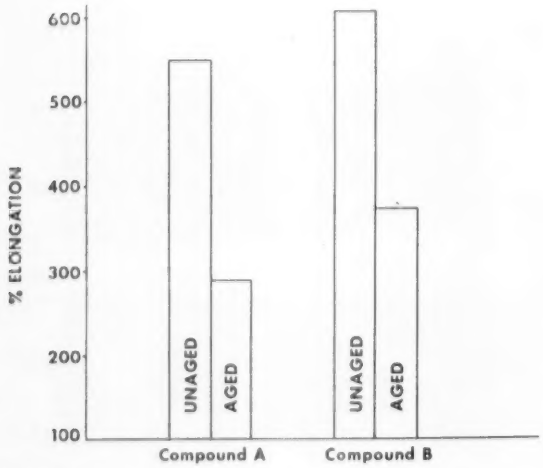


FIG. 11—Elongation data of two heat-resistant butyl rubber compounds (aging = 8 hours at 400°F. in circulating air oven).

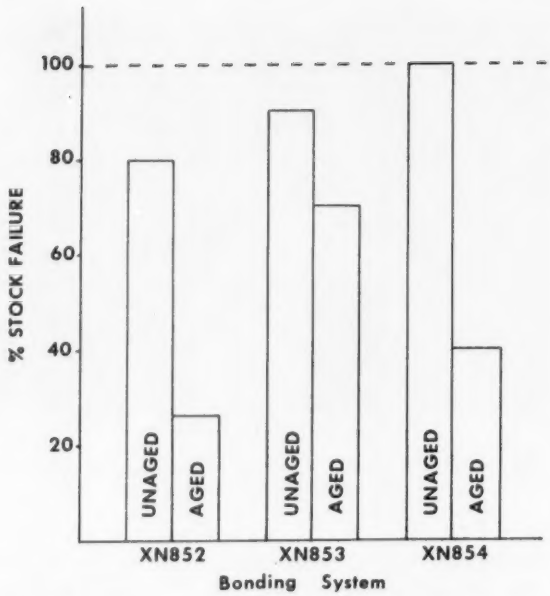


FIG. 12—Strip aging test of heat-resistant Butyl Compound A (aging = 8 hours at 400°F. in air oven).

to us completely compounded, and composition was not known. The composition of the one stock, hereafter called Butyl Compound A, prepared by our own laboratory, is shown below:

Butyl Compound A

	Parts
Butyl Rubber 325	100.0
HAF Black	50.0
Zinc Oxide	5.0
Stearic Acid	1.0
Hypalon S-20	5.0
Dimethylol Phenol Resin	12.5

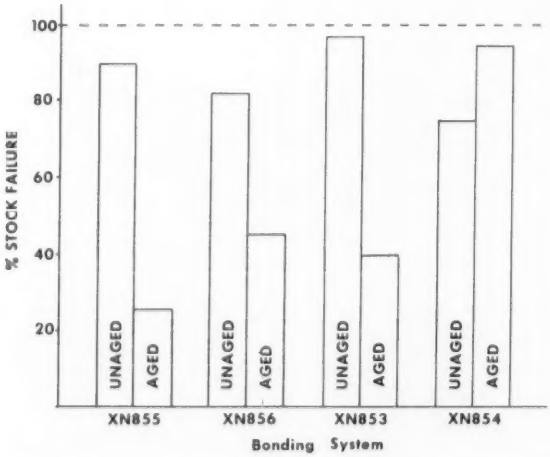


FIG. 13—Strip aging tests of heat-resistant Butyl Compound B (aging = 8 hours at 400°F. in air oven).

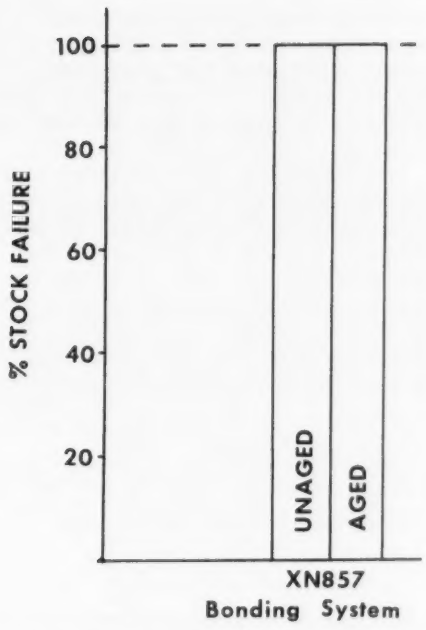


FIG. 14—Strip aging tests of heat-resistant Butyl Compound C (aging = 144 hours at 320°F. in air oven).

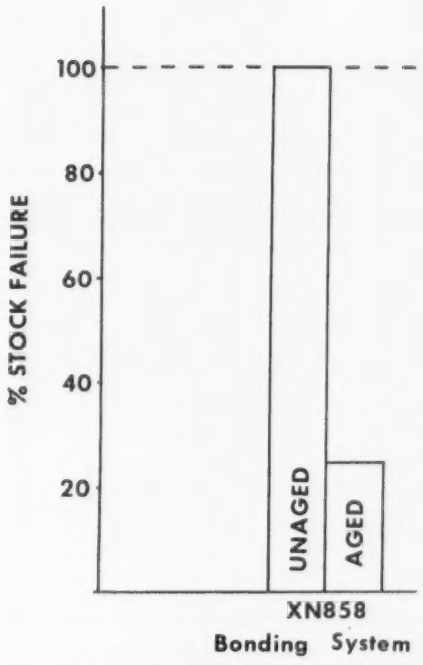


FIG. 15—Strip aging tests of heat-resistant Butyl Compound D (aging = 8 hours at 400°F. in air oven).

The compositions of Stocks B, C and D are unknown.

Two of the stocks were checked for physical characteristics before and after an aging period of eight hours at 400° F. in circulating air. Figure 10 shows tensile strengths close to 2400 pounds before aging for both stocks, with the drop-off as shown in that figure being observed after aging. Modulus increased, as would be anticipated. Figure 11 illustrates the drop-off in elongation during aging, also to be expected.

Cut-and-strip tests were then run on several bonding systems, after preliminary elimination tests. Six systems in all will be reported here. Figure 12 shows per cent stock failure observed from a cut-and-strip test of three different bonding systems on Stock A, before and after aging. In the middle system, we see that adhesion after aging retained virtually all of the pre-aged value. The third system looked better initially, but lost more during aging.

In Figure 13, we see some of the same bonding systems plus some new ones applied to Stock B, with varying degrees of success. The fourth system in this figure is noteworthy in that the aged adhesion was nearly perfect, and in fact, was better than the unaged adhesion.

Figure 14 shows the results of tests of Compound C, heat aged at 320° F. for 144 hours in the circulating air oven. Adhesions before and after aging, using the adhesion system noted, were both entirely satisfactory, with 100% stock failures.

Compound D, as shown in Figure 15, had excellent unaged adhesion using the system noted, but the value dropped considerably during eight hours aging at 400° F. Nevertheless, there was a definite degree of residual adhesion after aging.

Distention tests of several cement systems on Compounds A and B are detailed in Figure 16. These assemblies were all subjected to eight hours aging at 400° F., under 100% distention. While stock failure was substantially under some of the earlier results, it must nevertheless be noted that what rubber failure area was left after the aging, was area where the bond had been subject to a very substantial pull during the entire eight hours at elevated temperature, without giving way, despite loss of adhesion in adjacent areas.

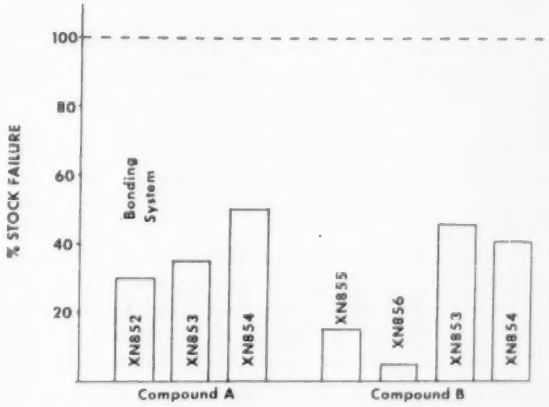


FIG. 16—Distention aging tests of heat-resistant Butyl Compounds A and B, 100% distention (aging = 8 hours at 400°F. in air oven).

Conclusion

In conclusion, we may say that our previous concepts of high temperature limits of bonded elastomer-to-metal assemblies, involving basically organic elastomers, have been raised appreciably. The bond quality produced by experimental bonding systems on several different stocks in two polymeric bonding systems has been found to be satisfactory for many uses involving high temperature exposure, service or aging. In some cases, the adhesion is retained 100%. These tests included observations using a static test with dynamic implications, the Adhesion Distention Test. Through elimination testing of the type described, experimental bonding systems have been developed which have been successful in less rigorous environment testing of several commercial or applied elastomer-metal bonded assemblies.

The Adhesion Distention Test has been found most useful; although the stocks retained good physical properties when aged in static condition, there was considerable evidence of rubber failures among the various stocks when aged under stress. This simple test may be useful for checking properties other than adhesion, once satisfactory adhesion systems are found with which to perform the test.

One isolated test, with a butyl stock aged at 450° F. for four hours, with satisfactory adhesion retention, not reported in this paper, leads the authors to believe that the 400° F. used in the other work need not be considered a limit. It should be emphasized that the tests and data reported were only comparative, for the purpose of selecting the best of certain experimental bonding compositions for trial in an actual part intended for high temperature use.

ACKNOWLEDGEMENT

The helpful assistance of Howard Gillette in obtaining stress-strain data on the stocks is hereby gratefully acknowledged.

Low Temperature Rubber

THE ESSENTIAL "rubberiness" of natural rubber is lost when it is cooled to low temperatures. In certain products — components for aircraft or for arctic vehicles, for example—this change in properties may render the rubber unserviceable. Research organizations working on natural rubber have set out to devise methods of producing, for these conditions, compounds which will be fully competitive with synthetic rubbers made specially for the same purpose.

Two distinct changes take place when rubber is cooled. The first is a slowing down of the normally rapid motion of the rubber molecules, leading to an increase in the stiffness of the rubber. As the temperature falls from —20° to —75°C. the rubber is slowly transformed from an elastic material, becoming first leathery and then a brittle solid.

Investigators working at the British Rubber Producers' Research Association have found that rubberiness of natural rubber at low temperatures can be improved by incorporating in a particular way certain liquid plasticizers such as dioctyl sebacate. The temperature at which rubberiness is lost is reduced by as much as 20°C.

The second low temperature effect is a much slower, progressive stiffening of the rubber when it is kept for a time at temperatures ranging from about 0° down to —45°C. This is due to the development of "crystalline" regions, where the rubber molecules pack together in a regular pattern. The greater the proportion of rubber molecules crystallized, the less is the rubberiness of the whole. The rate of crystallization is highest at about —25°C., and is greatly increased if the rubber is stretched. Although vulcanization retards crystallization, even a well vulcanized rubber compound will crystallize and lose its flexibility too rapidly to give satisfactory service under certain low temperature conditions.

Work at the B.R.P.R.A. and the Rubber Stichting in Holland has shown that the structure of the rubber molecule can be changed, making it much less liable to crystallization at low temperature, by reacting it with a class of chemicals known as thiol acids. The most effective way of bringing about the reaction is by heating suitably stabilized rubber latex with a small amount of thiol acid in the presence of a catalyst—a process which has been patented by the B.R.P.R.A.

Because certain non-rubber substances present in some latices inhibit the reaction, doubly centrifuged latex has been used in semi-commercial preparations in the United Kingdom. Recent experiments at the R.R.I. have indicated how the process may be modified to make it work more simply and cheaply with fresh latex. The rubber produced by coagulation of the reacted latex is processed by methods little different from those used with normal smoked sheet.

The potential importance of this modified natural rubber is indicated by the Ministry of Supply in the United Kingdom having recently prepared a specification for what is known as "crystallization-inhibited rubber", and by the interest in it shown by inquiries from the U. S. A., Italy and Australia.

—Reprinted from *Planters' Bulletin of the Rubber Research Institute of Malaya,* September, 1958.

How Goodyear has increased tire production through installation of a system for

Handling Pelletized Rubber

AT THE Gadsden, Alabama plant of Goodyear Tire & Rubber Co. a new concept in the handling of crude rubber is aiding in the production of thousands of passenger car and truck tires a day. Contamination problems are said to have been virtually eliminated by a carefully engineered system whereby the batching from crude Banbury to finish-run Banbury is completely automated.

This new concept utilizes a system by which pelletized rubber is conveyed by a series of pneumatic conveyor tubes, called Airveyors, and replaces the conventional system, in which rubber slabs are sheeted on a mill. The Airveyors are made by Fuller Co., Catasauqua, Pennsylvania. For charging the Banbury it used to be necessary for the operator to slice off an "X" amount of rubber from each slab, weigh each to attain the desired amount, and have them all placed together on a charging belt for delivery.

The Pellet-Pneumatic Process

Now when bales of crude rubber arrive at the plant, they are stored and pre-conditioned for production line processes. After conditioning is completed, the rubber is moved by roller conveyors to a Banbury mixing machine. An operator, by means of stop-limit switches, selects bales for specific formulation, and adds other ingredients directly into the mixing chute which leads to the Banbury (Figure 1).

After the high-pressure mixing operation is complete, the rubber compound is discharged into a pelletizer below. Its operation is similar to that of a giant meat grinder. From here hot, pelletized rubber drops down another chute, from where a belt conveyor delivers the pellets to a series of cooling screw conveyors. Here they are slurried in water and chemicals to keep them from sticking together.

The last of these cooling conveyors discharges directly into a surge hopper which empties by belt feed into a large Airveyor (Figure 2). The pneumatic tube, by means of an exhauster, sucks the pellets up to the ceiling of the second floor. From here, the pellets can go either to a gondola loading station or to a unique system of special stack bins (Figure 3).

At the gondola loading station loads of pellets are automatically discharged into waiting gondolas. Special fork lift trucks pick up the gondolas and in one operation deliver and empty them into paired dump sinks in the floor. There are four such double-sinks, each leading to concentrating hoppers with a weighing arrangement on the floor below.

The special stack bins, a product of Richardson Scale Co., Clifton, N. J., consist of a vertical series of ten bins, each of which is a separate unit. The bins are discharged pneumatically with bin-length pistons.

Pellets are delivered by the Airveyor to a feeder above the top bin (Figure 4). When this bin is full, a flow control switch is actuated automatically and the bin is discharged into the one below it. After a predetermined time interval to assure complete discharge, the bin gate closes and the bin is ready for another load. The same transfer sequence is followed through the other bins to the bottom (Figure 5).

Auxiliary equipment for the stack bins includes vibrating feeders for full flow of dribble feeding, automatic weighing scales with dial heads and Weightronic Controls for remote weight setting and indication, and a remote panel with controls and monitoring lights for manual or automatic operation of the entire handling system.

From the bottom bins, or from the dump sinks, the pellets are discharged into double-concentrating surge hoppers. These Richardson material supply hoppers are equipped with special switches which call for supplies automatically. Each hopper is equipped with a stream regulating slide. Pellets are supplied from these hoppers to Syntron F-44 vibrating flat pan feeders 24 x 48-inches in size.

Vibrating feeders deliver pellets to five hopper suspension scales, equipped with double hopper door discharge. Weighed quantities from each hopper are discharged into pickup hoppers from which the Airveyors take the material to finish-run Banburys (Figures 6, 7 and 8). From these machines finished rubber compounds are fed to production units.

Specifications of the Pneumatic System

The large Airveyor which conveys the pellets from the pelletizer to delivery for weighing, a distance of approximately 500 feet, is eight inches in diameter. The four Airveyors operating from the sink dump scales to inlet spouts of the finish-run Banburys are seven-inch systems varying in length from 185 to 255 feet.

All of these Airveyors are of the vacuum type, employing positive pressure exhausters for air supply. Each conveying system is equipped with its own individual bag-type filter, automatic in operation, which provides for 100% visible dust retention. Exhausters and filters are located on the roof. A control panel permits manual or automatic operation of the entire handling system from crude Banbury to finish-run Banbury (Figure 9).

Automated System for Handling Pelletized Rubber

FIG. 1—Bales of crude rubber and chemicals are belt-fed directly into a chute leading to a Banbury mixer.

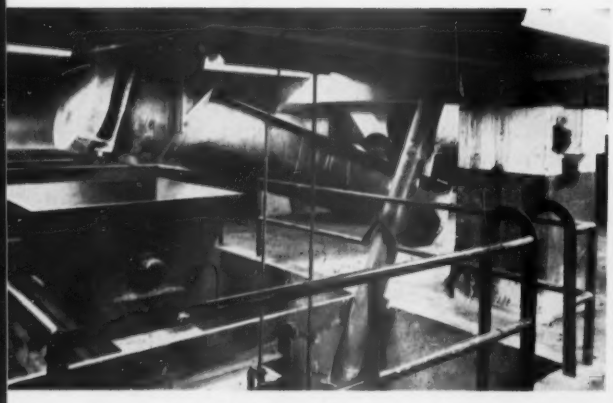


FIG. 2—The last cooling conveyor dumps pellets from a pelletizer below the Banbury into a hopper (left center) from which they are carried to an Airveyor (right center).

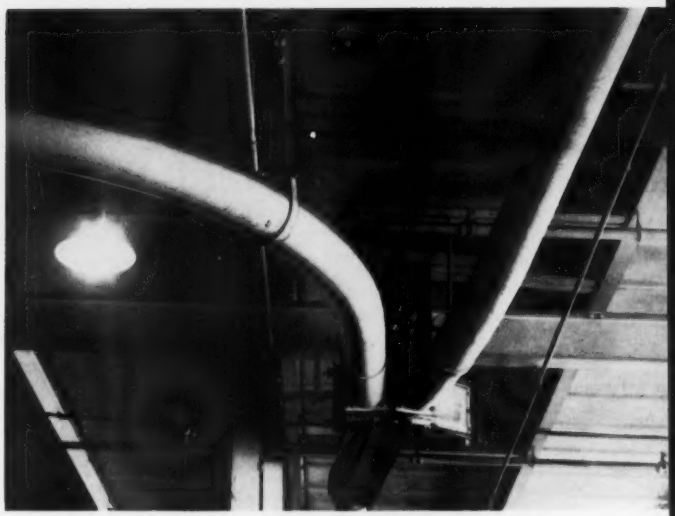


FIG. 3—A two-way switch in the Airveyor directs pellets either to gondola loading stations or to stack bins.

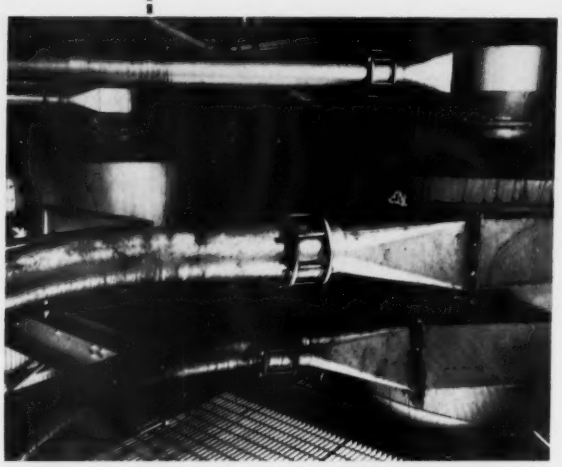


FIG. 4—The system leading to stack bins. The top pipe is an exhauster, the center pipe the Airveyor itself, and the bottom pipe is a recirculation line for emergency use.

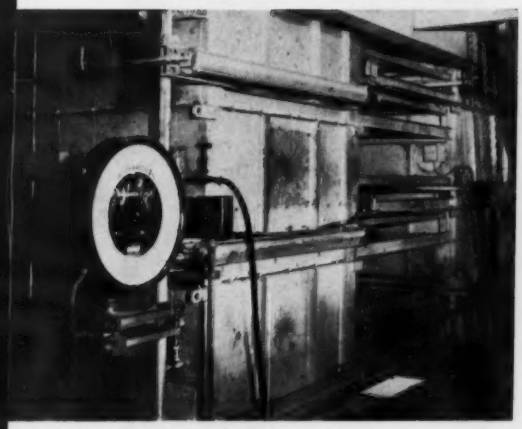


FIG. 5—The bottom sections of the stack bins discharge into hoppers which lead to suspension scales. The dial indicates the weight of the load on the floor below.

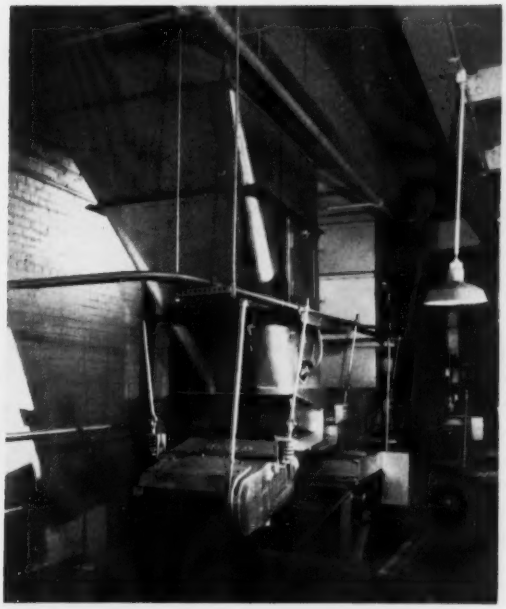


FIG. 6—The concentrating surge hoppers below the stack bins and sink dumps which receive the pellets and deliver them by means of vibrating feeders into open type hopper suspension scales.

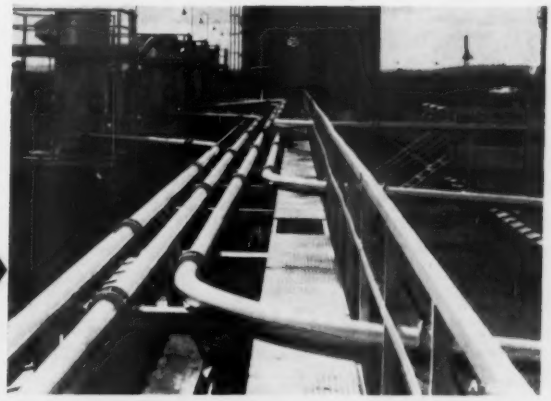


FIG. 7—Four of the five Airveyor systems at the plant. Weighed amounts of pellets are conveyed from the suspension scales.

FIG. 8—The Airveyors lead into finish-run Banburys for completion of compounding.

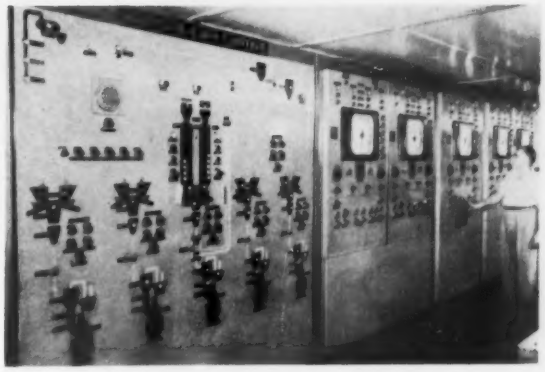


FIG. 9—A control panel permits automatic operation of the entire handling system from crude Banbury to finish-run Banbury.

Low-Cost Molds for Rubber

By ALBERT M. CREIGHTON, Jr.
President, Devcon Corp., Danvers, Mass.

FIG. 1—The new molding material being poured around a model to form a precise reproduction.

A new molding material and technique offer savings in money and time . . .

FIG. 2—A synthetic rubber part molded by Tyer Rubber Co. Steel guide pins were inserted and corresponding holes drilled in the Devcon C.

MOST dies for molding rubber and plastic materials are made of aluminum, steel, or other metals and require many days or weeks of tooling. The cost sometimes runs into thousands of dollars. A new material and technique was recently developed by the Devcon Corp. of Danvers, Mass., for making low-cost molds in a matter of only a few hours of total working time. This company does not manufacture any completed molds, but supplies a material known as Devcon C, together with the "know-how" so that mold-makers, molders, or rubber manufacturers can make their own molds.

Many plastic and rubber products, never possible before because of the high mold cost, excessive time required to build the die, limited demand, or other reasons, can now be put into production quickly and inexpensively. No machining or finishing of the mold is generally required. A model made of wood, plaster of paris, or practically any other material can be used. Devcon C, which contains approximately 80% aluminum and steel and 20% plastic, is simply poured and

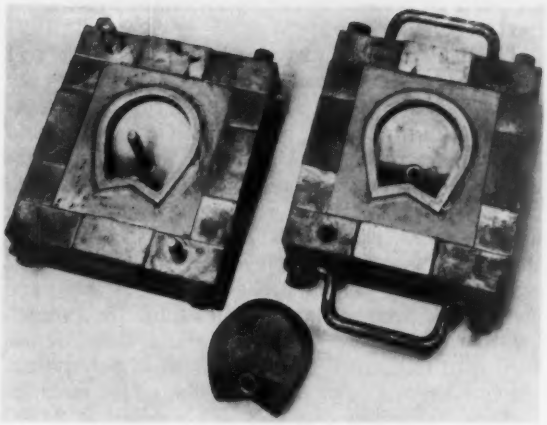


FIG. 3—Single cavity mold designed by United Shoe Machinery Corp. for forming a rubber part with a metal insert.

formed around the model (Figure 1). When hardened the material will form the final surface of the die, which will be a precision reproduction of the model itself, with every detail reproduced.

Many rubber companies are now using this material. For example, the Tyer Rubber Co. of Andover, Mass., which is well known for making a wide variety of molded rubber products for the automotive and other industries, is very proud of its high quality standards and states that the new molding material has been used for manufacturing several low-cost but intricate molds for its customers. M. G. Johnston, Plant Engineer, reports substantial savings in time and money by using the new method, and said further that customers were extremely pleased with the prompt delivery of the completed parts. One rubber mold, for example, cost approximately $50 (Figure 2) and was made in two days, as compared to two weeks if made by conventional methods.

Savings in Dollars and Time

The United Shoe Machinery Corp. is conducting research in many fields never attempted before and is constantly changing designs to improve its existing products. The Research Division reports that it was able to save many days of tooling and a considerable amount of expense with the new product. Figure 3 illustrates a single cavity mold used for making a number of rubber parts with an insert. The final piece had a durometer of 30 to 60. The inner portion of the mold is made of the new material, the outer of steel. The total elapsed time needed for manufacturing the mold—including making the model, inserting guide pins and other operations—was only one week as compared to a minimum of six weeks needed before adoption of the new techniques. The total working time required for making the Devcon C portion was approximately six hours.

Raybestos-Manhattan, Inc., one of the country's outstanding custom molders, has found the new molding technique of great value in its operations. The company reports that the cost of a mold made of the new material is usually one-third or less of the cost of a similar die made of metal. The company feels, however, that the biggest advantage is the savings in time. For example, a number of silicone rubber wipers for aerial cameras (Figure 4) were delivered in 24 hours, instead of three weeks, the time which would have been needed had the mold been made of steel. In this case, as in many others, prompt service to customers was essential.

Raybestos-Manhattan has used the new technique for molding natural rubber, silicone rubber, and also neoprene. The only machining necessary has been squaring off the outside of the mold for mounting in the presses. A very high finish and close tolerances are possible. Steam-heated platens were used in all cases and heating or cooling coils, which sometimes have been imbedded in the Devcon C, were not considered necessary. The company reported that the new molding material has a tendency to hold the heat and that this characteristic is a definite advantage in curing the parts properly.

How to Make a Mold

The process for making a mold for use with rubber is relatively simple. A model made of wood, rubber or practically any other material is prepared. This model is then placed in a wooden or sheet metal box and coated with a special release agent which is sup-

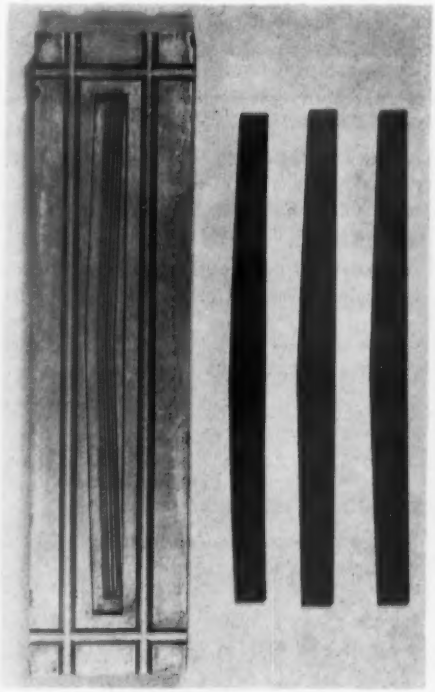


FIG. 4—One-half of a mold for rubber wipers, and the finished silicone rubber product.

plied with every package by the manufacturer. A hardening agent is added to Devcon C and this mixture is poured into the box containing the model. When hardened, this will be the male or female portion of the mold. The hardened form and the exposed surface of the model are then coated with release agent. The new material is poured over the first portion and the entire box is placed in an oven for a short baking period in order to get the maximum heat resistance. The hardened material is then removed and the two portions are separated. The release agent is used to prevent the second layer from adhering to the first portion. The amount of clearance, therefore, is equivalent to the thickness of the release agent. Guide pins are then inserted and the mold is ready for use.

The new molding material is extremely tough, and can be pounded and handled quite roughly without damaging. Similar in many respects to aluminum, it is lightweight, weighing 16 cubic inches per pound. Its heat transfer is not as high as that of steel; once up to temperature, however, it will hold its heat extremely well, which, according to the engineers at Raybestos-Manhattan, is very important in their production work. If quick heating or cooling is essential, a small coil for steam or cold water can be imbedded in the Devcon C before it hardens.

The material has very good heat resistance and has a compression strength of over 5,000 pounds per square inch at 400°F. There is practically no shrinkage or distortion during hardening. On a small mold for a rubber part measuring 5 x 3 x 1-inch, for example, the shrinkage was approximately 0.0005-inch per inch. When hard, it is permanent and will not deteriorate or change. It can be drilled, ground, threaded or machined with regular metalworking tools.

Devcon C is not as strong or hard as steel, and therefore is recommended, at least for the present, for short runs only. In the plastic industry it has been used for making fairly long runs of polystyrene, vinyl, nylon and other plastic products. One mold for a plastic rotor cost only $85 as compared to $4500 for a similar mold made in steel. The total working time required was approximately eight hours.

Additional improvements are being made in the material. New techniques of handling the new molding material and new "short cuts", suggested by many molders, are being tested in the field. Considerable savings in time and money have already resulted for these concerns and for their customers.

Coming Next Month...

The Colloid Phase of Carbon Reinforcement of Rubber—By H. A. Braendle, G. L. Heller and J. W. White, Columbian Carbon Co., New York, N. Y.

A study which indicates that by recognizing the time factor in colloidal reactions, a significant improvement in the carbon reinforcement of rubber can be effected.

Ozone Resistance of Butyl Rubber—By R. F. Grossman and A. C. Bluestein, Anaconda Wire & Cable Co., Marion, Ind.

An investigation into the variables which affect the ozone resistance of butyl rubber.

Behavior of Silicone Rubber in Sealed Systems—By W. J. Bobear, Silicone Products Department, General Electric Co., Waterford, N. Y.

An analysis of the effects of choice of filler and curing agents, with data on curing temperatures and application design.

Determination of Traces of Copper in Rubber Chemicals and Rubber Products—By R. C. Madan, Firestone Tyre & Rubber Co., Ltd., Brentford, Middx., England.

Report on an absorptiometric method using zinc dibenzyl dithiocarbamate which is extremely sensitive and time saving.

Use of Wooden Pallets for Handling Rubber—by William H. Sardo, Jr., National Wooden Pallet Manufacturers Association, Washington, D. C.

Wooden pallets spell savings in the handling and storage of rubber; hints are given in this article on how to use them to best advantage.

PLUS A R/A SPECIAL INDUSTRY REPORT

How Good an Executive Are You?

Hints for managerial personnel in the rubber industry on how to best fulfill their functions.

EDITORIAL

FROM time-to-time small complaints are heard from some quarters in the rubber industry that technical meetings are "degenerating into sales conferences." We would refute this argument. Editors of trade publications generally have occasion to attend a great many technical meetings and we are no exception to the rule. Lately, we have been paying particular attention to what actually goes on at these meetings and we would like to pass along our conclusions.

Firstly, the average age of those participating in technical meetings has been going down in the past few years. There was a time when most of our staff members were apt to recognize most of those present. Now, there seem to be many new young people in attendance, and we find ourselves saying "Who is that?"

These younger members of the rubber fraternity seem to have one attribute in common—a desire to learn. They listen attentively to the speaker. They ask questions. Indeed, at several meetings we have attended in the past few months, these younger listeners have been giving some speakers a "hard time" with pointed questions. And this is all to the good.

The speakers themselves are almost representative of a new breed. The Dr. Smith who is a recognized authority in his field seems to be getting younger and younger—his interests broader—his coverage wider. And this is good too.

While we would not for a moment deprecate the talents and the know-how of the older generation of rubber technologists, it is heartening to note that the newer generation is coming along in fine style. Rubber compounding, still thought of by many as an art rather than a science, is becoming more precise, if the attitudes of the younger chemist are any criterion.

As editors, we can tell you that the younger chemist is prolific. He writes more and submits more papers for publication. He is not only scientific, he is practical—a quality some would not attribute to a younger generation.

Now when we hear talk of technical meetings becoming sales sessions we reflect on the implications and we refute them. Of course, some amount of "buying and selling" does occur. On the face of it there is nothing wrong about it at all.

In essence, there seems to be a greater dedication to scientific principles today than heretofore. We can be proud of our technical meetings and the attendance each meeting attracts. And we can be proud of our eager younger citizens. The rubber industry will be in good hands for years to come.

Special Industry Report

A further look at

Executive Compensation

in the Rubber Industry

By JOHN MACOMBER

McKinsey & Company, Inc., New York, N. Y.

Each year McKinsey & Company, Inc., Management Consultants, conducts an annual survey of executive compensation in American industry. The 1958 survey is based upon data gathered from 642 companies, listed in the leading stock exchanges, representing eighteen industries. In the case of the rubber industry, the data are based on nineteen firms, including some of the smaller companies as well as the giants.

The fundamental purpose is to chart the significant changes occurring from year to year, particularly as these changes relate to volume and profits. Last December, RUBBER AGE published McKinsey & Company's summary of executive compensation in the rubber industry; the purpose of this report is to see what has happened between 1956 and 1957.

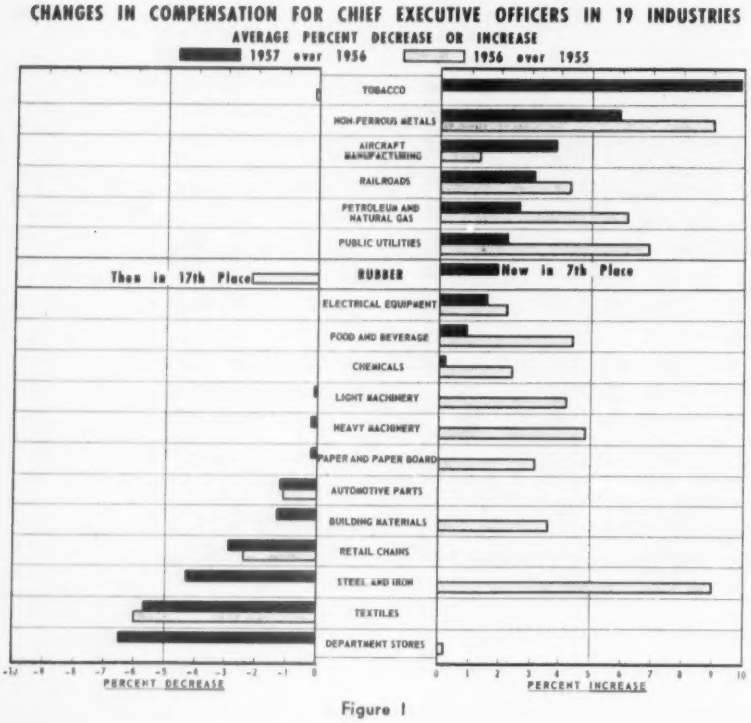


Figure 1

THE YEAR 1957 was a good one for chief executives in the rubber industry—a great deal better than the year before. Based upon the McKinsey survey of 19 of the leading rubber companies, and 18 other industries, the increase in pay for chief executives in the rubber industry averaged 1.9 per cent over 1956, compared to a decline of 2.2 per cent in 1956 from 1955. Obviously, this is important not only to the "boss" but also to down-the-line management since the compensation level of the chief executive officer customarily establishes the pattern for all other executives.

Furthermore, this boost in the compensation of rubber company chief executives is particularly significant in terms of the fact that:

(1) Increases in compensation for the chief executives in 18 other industries took a decided dip from the previous year. Their compensation rose an average of only 1.0 per cent in 1957, compared to 5.1 per cent in 1956 and 6.3 per cent in 1955. Unquestionably, this decline can be blamed primarily on the recession which has had the effect of reducing the net profit of the 642 surveyed companies by an average of 3.2 per cent (despite the fact that sales were up 5.3 per cent).

(2) In terms of rate of increase, the rubber industry now ranks seventh as compared to seventeenth in 1956 (Figure 1). The average increase is particularly important this year when noting that nine industries reduced chief executives' pay while only five did in 1956.

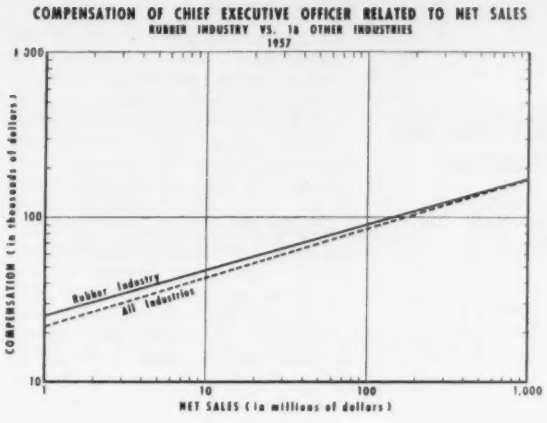

COMPENSATION OF CHIEF EXECUTIVE OFFICER RELATED TO NET SALES
RUBBER INDUSTRY VS. 18 OTHER INDUSTRIES
1957
COMPENSATION (in thousands of dollars)
Rubber Industry
All Industries
NET SALES (in millions of dollars)

Figure 2

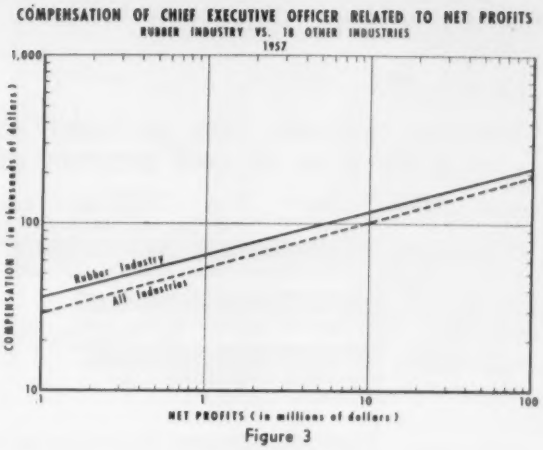

COMPENSATION OF CHIEF EXECUTIVE OFFICER RELATED TO NET PROFITS
RUBBER INDUSTRY VS. 18 OTHER INDUSTRIES
1957
COMPENSATION (in thousands of dollars)
Rubber Industry
All Industries
NET PROFITS (in millions of dollars)

Figure 3

Then too, with the exception of tobacco, rubber was the only industry with a minus percentage in 1956 to jump into a plus category in 1957. Automotive parts, retail chains, and textiles continued by having another year of reduction.

With this fundamental shift in rubber compensation in mind, let's see what else has happened to compensation in this industry over the past year and try to answer such questions as:

(1) Are compensation opportunities in rubber above or below other industries?

(2) Do short-term changes in individual company volume and profits have a bearing on the chief executive's pay?

(3) How do the second, third, and fourth highest paid men do relative to other industries?

(4) How does rubber compare to others in the use of fringe benefits?

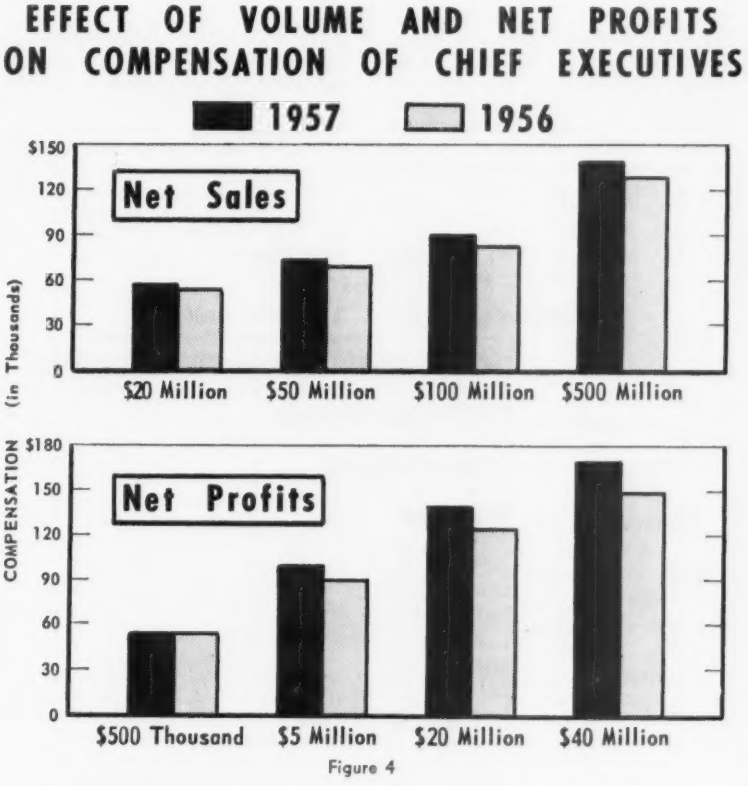


Figure 4

Compensation Opportunities

Figures 2 and 3 show clearly that the chief executives in the rubber industry continue to receive somewhat greater than average compensation compared to other industries relative to volume and profits. These two exhibits trace the average compensation-salary, bonus and deferred earnings—at varying levels of volume and profit for all industries against rubber in particular. By following the lines across the charts, it is possible to pick out the spread that exists between rubber on the average and all other industries at any given volume and profit level. For example, at $20 million sales volume, the average compensation of the chief executive in a rubber company would be $58,000 while the average for all other industries would be $52,000.

The most important change between 1957 and 1956 rests in the fact that all rubber companies, regardless of size, are now above average. This is different from 1956, when the smaller rubber companies were above the 18-industry average, while rubber companies having greater than $100 million in sales and $10 million in profits were below the average.

Figure 4 indicates the influence of volume and profits on chief executives' compensation in graph form for 1956 as well as 1957. The difference in compensation among the smaller and larger concerns is substantial. Then too, this chart clearly shows the general increases in compensation that went into effect between 1956 and 1957. The only category that does not appear to benefit is that comprising those companies having net profits of $500,000 or less.

Effect of Volume and Profit

Changes in compensation for chief executives tend to follow shifts in either volume or profits, with the latter usually being the dominant factor. For example, net profits of all the companies included in this survey de-

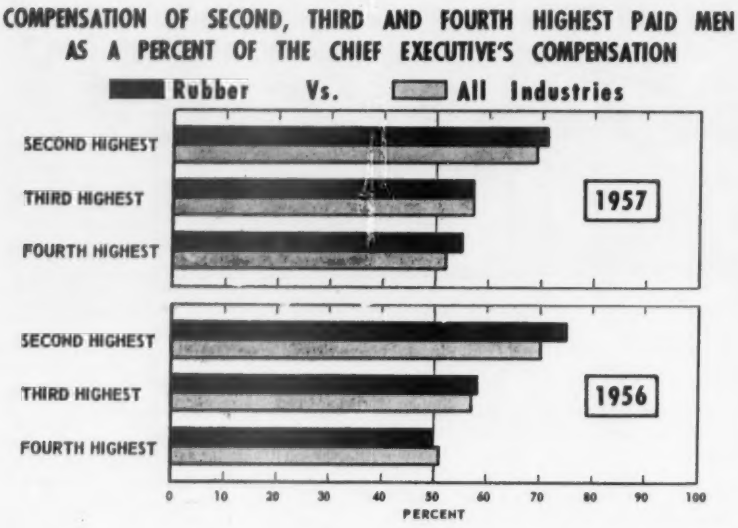


Figure 5

clined in 1957 relative to 1956, and consequently—even though sales were up—the average rate of increase in the compensation of chief executives fell off markedly.

In the rubber industry, profits fell while volume increased—but contrary to the general industry pattern, compensation of rubber company chief executives did not conform. Thus, 32 per cent of the chief executives of rubber companies had increases in their compensation even though the profits of their respective companies went down; and 42 per cent of the executives' compensation remained the same or went down even though their companies had increased profits. In only 26 per cent of the rubber companies did profits and compensation move together. Furthermore, comparing sales volume changes to the chief executive's compensation reveals the same inconsistency—there is no real relationship between yearly moves in volume and profits and the boss's compensation.

It is interesting to note that a reverse relationship occurred in 1956. At that time, a 2.2 per cent decrease in compensation (on the average) came about despite a 3.2 per cent average increase in sales and a 5.5 per cent average increase in rubber company profits.

The conclusion drawn last year and again obvious this year is that in the rubber industry changes in sales and profits tend to have less influence on the chief executive's compensation than in other industries. The most likely explanation of this phenomenon seems to lie in the universal awareness of the historic yearly ups and downs in sales and profits that are typical of most rubber companies, and a general tendency to base compensation on long-term trends rather than on short-term swings.

As Figure 5 shows, the second, third, and fourth highest paid rubber executives continue to be slightly above or at least equal to industry as a whole. The only significant changes between 1957 and 1956 occurred in the second and fourth highest categories—the former dropping four percentage points and the latter rising five points.

Fringe Benefits

Use of various forms of supplemental compensation continued at least as strongly, and in some cases, actually increased. As Figure 6 shows, the three most dominant types are: (1) pensions, (2) stock options, and (3) deferred compensation. Interestingly enough, at the present time only one company studied in the rubber industry does not have a pension plan. Stock options are now in effect in 47 per cent of the companies (against the 18-industry average of 60 per cent) as compared to 36 per cent in 1956. On the other hand, the number of deferred compensation arrangements decreased from 45 per cent in 1956 to 37 per cent in 1957. Still, the use of deferred compensation contracts remained relatively high when compared to the all-industry average of only 8 per cent.

The remaining forms of compensation (with one exception—consulting contracts) show rubber to be at least equal or better than all of the other industries.

Summary

From this, the following points seem to stand out clearly:

(1) Compensation of the chief executive officers in rubber companies continues to be higher than the industry average.

(2) Significantly, the short-term influence of changes in volume and profits on the chief executive's compensation is much less than that in other industries.

(3) The second, third, and fourth highest paid men draw at least as high and often higher compensation than those on an equal level in other industries.

(4) Rubber continues to be above average in nearly all of the various forms of fringe benefits.

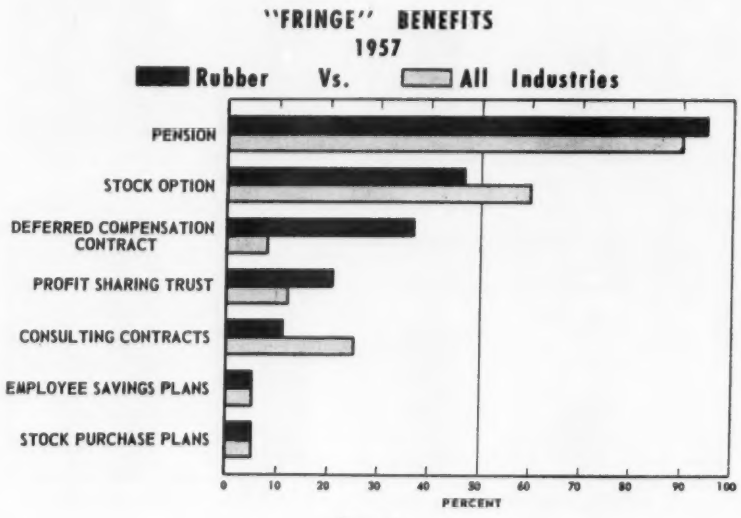


Figure 6

Armed Forces Hold Conference On

Elastomer Research and Development

► Some 243 representatives from the armed forces and the nation's leading universities and industrial research laboratories, met at the Hotel Miami in Dayton, Ohio, from October 15 through 17 for the Fifth Joint Army-Navy-Air Force Conference on Elastomer Research and Development. The three-day meeting was designed to coordinate research and development among the military services and to enlist the aid of top academic and industrial talent in the solution of critical problems.

The audience heard 36 technical papers on the effects of high temperatures, compatability with fuels, rocket propellants, nuclear radiation and other topics currently of interest to those engaged in elastomer research. The program was divided into three sessions: "Behavior Evaluations of Elastomers Under Unusual Service Environments," under the chairmanship of Dr. J. C. Montermoso, chief, Elastomer Branch, Quartermaster Research and Development Center; "Basic and Applied Research," with Dr. J. H. Faull, Jr., Office of Naval Research, Department of the Navy, serving as chairman, and "New Polymers and Their Prospects," with Dr. C. S. Marvel, University of Illinois, presiding.

Bartholomew Opens Program

The program opened with a welcome by E. R. Bartholomew (Materials Laboratory, Wright Air Development Center), general chairman of the meeting. Col. J. C. Dieffenderfer (chief, Materials Laboratory, Wright Air Development Center) followed with an introduction to the purpose and aims of the conference. J. R. Townsend (Office of the Assistant Secretary of Defense, Research and Engineering) then spoke on "Basic Research—The Frustrating Question."

Dr. Benjamin S. Garvey, Jr., (Pennsalt Chemicals) read a short tribute to T. A. Werkenthin, Bureau of Ships, Navy Department, recently deceased. A short period of silence in acknowledgment of Mr. Werkenthin and his notable contribution to the field of elastomer research was observed.

Dr. W. R. Kirner, program director for chemistry, National Science Foundation, who was scheduled to present an address on "Program of the National Science Foundation," was unable to attend. His address will be published in the minutes of the meeting, which will include publication of the technical papers in full.

Each of the three technical sessions was preceded by remarks from a representative of the armed forces. Dr. Montermoso spoke on the "Army Elastomer Program;" Dr. Faull on the "Navy Elastomer Program," and Dr. A. M. Lovelace (Polymer Section, Materials Laboratory, Wright Air Development Center) on "Air Force Elastomer Program."

During the afternoon session of the first day of the meeting a summary talk on current research and development in Great Britain was given by H. W. Hall of the Ministry of Supply, London, England. Mr. Hall spoke on the research currently being done in England, and what problems are engaging the attention of various scientists.

On the evening of October 15, an informal dinner was served in the Empire Ballroom of the Hotel Miami for those attending the conference. The dinner was preceded by a cocktail party. Government personnel were invited to tour the facilities of the Wright Air Development Center on the afternoon of the last day of the meeting.

First Technical Session

The technical program opened with the session on "Behavior Evaluations of Elastomers under Unusual Service Environments." In his paper on "The Evaluation of Elastomers for High Temperature Aircraft Tires", Glen Alliger (Firestone), reported on research by his company on high temperature properties of elastomers. In a current study, a comprehensive survey of properties of commercially available elastomers by means of special laboratory tests was made, and as a second phase, two selected elastomers were examined in a preliminary tire assembly with the object of evaluating the performance of these elastomers in various tire components at temperatures up to 550°F.

Considerable progress in solving tire construction problems peculiar to these elastomers has been made, and further work, it is anticipated, will make it possible to evaluate adequately the behavior of promising elastomers under conditions closely resembling those of high temperature service, he declared.

In the paper, "Selection of Rubbers for Use with Ninety Per Cent Hydrogen Peroxide," by R. E. Morris, R. R. James and R. Chow (Mare Island Naval Shipyard), presented by Mr. Chow, the evaluation of rubbers for use with 90 per cent hydrogen peroxide was described. Twenty-nine pure gum stock elastomers were tested, in addition to 12 silicone rubbers compounded with fine-particle silica, and 26 silicone rubbers and one fluorosilicone rubber compounded by manufacturers. It was found that most of the silicone rubbers and the fluorosilicone rubbers were visually unaffected by this treatment, and some of these rubbers caused relatively minor decomposition of the hydrogen peroxide. All of the other rubbers were visually deteriorated.

Gasket Service Life

A study designed to obtain information on the service life of rubber gaskets and packings such as O-rings in radiation fields was described in the paper "Effect of Gamma Radiation on Compression Set of Various Rubbers" by R. E. Morris, R. R. James and F. Caggegi (Mare Island Naval Shipyard). The paper was delivered by Mr. Chow. All of the specimens tested have approximately 100 per cent set after exposure to 10^7 roentgens. There was a considerable variation between the sets after exposure to 10^8 roentgen, which ranged from 60 to over 100 per cent.

Specimens prepared from a styrene rubber and from a urethane rubber had

Montermoso

Faull

Lovelace

Oleffenderfer

Marvel

Townsend

Hall

the least set, whereas specimens prepared from a silicone rubber, a fluorosilicone rubber and perfluoro rubber, respectively, had the greatest set. Five parts of certain antioxidants were found to reduce the set of natural rubber, styrene rubber and acrylonitirile rubber specimens.

In the paper "Elastomeric Binder Requirements for Solid Propellants," by Thor L. Smith (California Institute of Technology), the author analyzed the properties of the ideal elastomeric binder. These include a low glass-temperature and high elongation over a wide temperature range. The binder should not crystallize spontaneously during storage at any temperature, and should be cross-linked, preferably through stable primary valence bonds. The uncured binder should be a liquid which cures without evolution of gaseous products and with minimum heat release and shrinkage.

Also, the binder should dissolve little or no oxidizer and should be chemically stable for long periods in intimate contact with the oxidizer. Other factors to be considered in weighing the relative merits of potential binders are their oxygen balances, viscosities prior to cure, and densities.

These factors largely determine whether or not a castable propellant can be prepared which has optimum ballistic performance as well as adequate mechanical properties. The mechanical properties, however, also depend on the adhesion and other interactions between the binder and oxidizer particles. The binder should adhere well to the oxidizer, and, when unfilled, it should have a low modulus and should deform enormously under small stresses.

Investigation of O-Rings

In their paper "Investigation of O-Rings for Cylinder Liners of Diesel Engines," by S. A. Eller and A. A. Stein (New York Naval Shipyard), delivered by M. Hanok, the authors discussed the suitability of three neoprene, five nitrile and two silicone elastomers for O-rings when used to seal cylinder liners of diesel engines, a service condition which involves sealing against water at a temperature of 190°F. and pressure of 60 psi, and which means compression for long periods of time during which the seals may be in both active and inactive service.

The data obtained indicated that nitrile and silicone rubber O-rings had better load retention properties than neoprene O-rings, and that active service was more deleterious to silicone rubber O-rings than to neoprene and nitrile rubber O-rings, whereas inactive service had the opposite effect.

Other papers presented at this session of the conference included: "Determining Compatability of Elastomers with Liquid and Gaseous Rocket Propellants," by John H. Baldrige (Connecticut Hard Rubber); "Compatability of Rubbers with Explosives," by Mrs. M. C. St. Cyr (Picatinny Arsenal); "Evaluation of Seals Having Simultaneous Resistance to Oil, Water and Abrasion," by W. B. Lew (Puget Sound Naval Shipyard); "Testing Fluid Seals for Extreme Environments," R. J. Dunsmoor and F. W. Tipton (Boeing Airplane).

And "Evaluation of Elastomers in High Energy Fuels," by R. E. Headrick (Wright Air Development Center); "Methods for Studying Behavior of Elastomers in Aircraft Fuels at High Temperatures," by R. G. Spain and L. C. Smith (Wyandotte Chemicals); and "High Temperature Fluid Immersion Testing of Elastomers," by K. Murray (Wright Air Development Center).

Basic and Applied Research

Among the papers presented at the session on "Basic and Applied Research," was one entitled, "Dynamic Properties of Elastomers at High Temperatures," by C. B. Griffis, V. S. Javier and Angus Wilson, (Quartermaster Research & Engineering Command), delivered by Mr. Wilson. The authors described a new method for measuring the properties of elastomers both in air and in liquids at high temperature, an improvement on the method often used whereby elastomers are exposed to high temperature, and then returned to room temperature for measurement of changes in physical properties. Data are given for various elastomeric materials.

Maurice Morton (University of Akron) delivered his paper on "Hydrolitic Degradation of Urethane Polymers," in which he described a study carried out on the kinetics of the acid- and base-catalyzed degradation of urethane polymers in solution. Poly(ether urethane) was relatively stable toward acid but readily attacked by base. Hence, the urethane link appears to be the point of attack. The kinetics were found to be first-order with respect to both the polymers and the base concentration—i.e., over-all second-order. Also, there was evidence for the existence of a special "weak linkage", which led to a very rapid, but limited, initial degradation, either in acid or alkaline media. The poly(ester urethane), on the other hand, underwent substantial degradation in acid media, at a similar rate as the unextended simple polyester, indicating a random attack on the ester linkage. The kinetics showed a first-order dependence on both the polymer and acid concentration.

A paper by Z. T. Ossefort (Rock Island Arsenal) on "The Influence of Accelerator Residues on Age Resistance of Elastomeric Vulcanizates," described recent aging studies on styrene rubber and natural rubber vulcanizates prepared by various curing systems (sulfur-accelerator, accelerators only, peroxide and radiation) which indicate that only those vulcanizates based on accelerators (in the absence of sulfur) have excellent

age resistance whether inhibited or uninhibited.

The object of the present study was to attempt to ascertain whether variations in aging were due primarily to variations in the stability of the resulting network structure or to variations in the efficiency by which the inhibitor protects the vulcanizate. Results of aging studies under specified conditions indicated that age resistance was a primary function of the inhibitor present whether this inhibitor was added to the rubber or formed in situ from accelerator residues resulting during the curing process.

The subject of the paper by Oliver W. Burke, Jr., (Burke Research) was "Vinylic Filler Reinforcement of Elastomers." He described research, the object of which was to provide low heat build-up reinforcing fillers to replace all or part of the carbon black in styrene rubber used for larger-size military tires. It was discovered that synthetic elastomers can be reinforced with organic fillers — especially cross-linked, rigid polymer particles in the colloidal size range which are prepared by linking, that is, having a plurality of vinyl or allyl groups with or without other monomeric materials.

To obtain vinylic fillers, as these are termed, with low hysteresis when compounded with styrene rubber, it was found that polymeric emulsifiers must be employed in place of conventional non-polymeric emulsifiers in the emulsion polymerization of the filler.

Vinylic fillers prepared with carboxyl groups available on the particle surface yield compounds of high tensile strengths when compounded with styrene rubber. The most suitable size for vinylic fillers is in the range of 200 to 100 angstroms, and thus these particles are somewhat smaller than conventional reinforcing carbon black. Combinations of vinylic fillers and styrene rubber have now been developed which, according to laboratory tests, have physical properties equal to carbon black reinforced styrene rubber and further have considerably lower heat build-up.

Other Papers Presented

Other papers delivered at this session included: "Trends in Elastomer Research," by A. V. Tobolsky (Princeton University); "Research on the Ultimate Properties of Elastomers," by A. M. Bueche (General Electric); "Elastic Properties of Pure-Gum Rubber Vulcanizates," by Lawrence A. Wood (National Bureau of Standards); "Time-Temperature Behavior of Rubber from Measurements of Indentation Hardness," by Frank L. Roth (National Bureau of Standards); "Polymer Melt Compressibility," by Bryce Maxwell (Princeton University).

Also, "Dynamic Mechanical Properties of Polyolefins," also by Dr. Maxwell; "Anionic Polymerization Mechanisms," by C. G. Overberger (Polytechnic Institute of Brooklyn); "Thermal Degradation of Organic Polymers," by S. L. Madorsky (National Bureau of Standards); "Crystalline and Amorphous Orientation in Polyethylene," by Richard S. Stein (University of Massachusetts), and "Studies of Crystallization and State of Cure of Neoprene W Using Dielectric Measurements," by M. Hanok and I. N. Cooperman (New York Naval Shipyard), and G. Adler (Brookhaven National Laboratory).

New Polymers and Prospects

The last technical session of the conference was devoted to "New Polymers and Their Prospects." During this part of the program a paper by L. P. Marinelli, T. M. Andrews and J. C. Montermoso (Quartermaster Research & Engineering Laboratories) on "Organo-tin Elastomers," was delivered by Mr. Marinelli.

He reported on a program aimed at the development of organo-metallic elastomers having thermally stable and chemically resistant properties. Investigations had centered on organo-tin compounds, specifically, on the reactions of tributyltin methacrylate with fluoro-, chloro- or phosphorous-containing unsaturated compounds. Methacrylic acid, it was discovered, reacts readily in 1:1 ratio based on the mono-functionality of tin in tributyltin oxide to form a crystalline monomer that may be subsequently homopolymerized to an elastomeric product or copolymerized with other unsaturated compounds to rubbery materials.

Of the two systems, solution and emulsion, available for polymerization to yield elastomeric products, only the emulsion system utilizing either the lauryl mercaptan-potassium persulfate or the potassium persulfate-sodium bisulfiite systems produced tough, rubbery products.

Discusses Polyphenylene Oxide

In a paper on "Polyphenylene Oxide Polymers," by Gerald Staffin and Charles C. Price (University of Pennsylvania), delivered by Dr. Price, the preparation of polymers from 2,6-dimethyl - 4 - bromo - phenol was discussed. The authors found that the sodium salt of this phenol was extremely stable, except in the presence of reagents capable of oxidizing the phenolate ion to a phenoxide radical.

Shaking aqueous solutions of the phenolate with 2 to 10 mole per cent of such reagents as iodine, benzoyl peroxide, ferricyanide ion or lead tetracetate leads to rapid conversion to polymer and liberation of bromide ion. The polymer thus formed in a few minutes at room temperature is soluble in benzene and other organic solvents, has a softening point of about 200°C., has a bromine content equivalent to a degree of polymerization of about 20 and is formed in a yield corresponding to about 20 moles of phenolate converted per mole of initiator consumed.

The subject of a paper by E. L. Warrick (Dow Corning) was "New Silicone Rubbers." Mr. Warrick commented on the fact that the basic siloxane chain has an attribute which makes it particularly attractive to organic chemists interested in rubber—an inherent flexibility and tolerance for a wide range of substituents without loss of rubbery properties. Recently large amount of phenyl substitutents to improve radiation resistance have been added without appreciable loss of rubbery properties of the polymers. These same rubbers are promising for simple high temperature uses because of greater oxidative stability.

Incorporation of Fluorine

The incorporation of fluorine in the hydrocarbon substituent has served to improve fuel resistance, but the ability to form virtually any type of organic substitutent presages the coming of a host of special fuel- and solvent-resistant elastomers. There are indications that many of the goals in modifying silicone rubbers will be achieved by grafting techniques rather than organic chemistry.

The need for rubbers with the special advantages of the silicone rubbers without the use of ordinary press and oven cures has resulted in a series of room temperature vulcanizing (RTV) stocks. Recently it was found possible to achieve this without mixing in a catalyst and an ideal tube-type caulking material was produced. The interest in radiation cures has resulted in some silicone rubbers which can be cured at levels of 1/25 to 1/50 of the radiation dose required by natural rubber.

Other papers presented at this session included: "New Polymer Prospects for High Temperature Service," by Leo A. Wall, W. J. Pummer and S. Straus (National Bureau of Standards); "High Temperature Fluorinated Elastomers", by H. C. Brown (University of Florida); "High Temperature Elastomer Research," by L. W. Butz (Office of Naval Research), and "Quartermaster Corps Sponsored Fluoroelastomer Research at 3M,' by G. H. Crawford and J. C. Montermoso (Minnesota Mining & Manufacturing).

Still Other Papers

And "The Polymerization of 'Inorganic Rubber' Dichlorophosphinic Nitride," by C. P. Haber (U. S. Naval Ordnance Laboratory); "Compounding Fluoroelastomers for Aeronautical Applications," by W. R. Griffin and J. M. Kelble (Wright Air Development Center), and "Properties and Applications of 'Coral' synthetic natural Rubber," by R. F. Dunbrook (Firestone). Dr. Dunbrook's address closed the formal program of the conference.

Elastomer Group Hears Lerner

► The Elastomer and Plastics Group of the Northeastern Section of the American Chemical Society held its first meeting of the 1958-59 season on October 21 at the Museum of Science in Boston, Mass. Over 90 members and guests were in attendance at the meeting which featured an election of officers for the new season and an address by M. E. Lerner, editor of RUBBER AGE, on the "Latest Developments in the Polymer Field." The following members have been elected to office:

Chairman, J. Horace Faull, Jr. (Consultant); *Chairman-Elect,* James H. FitzGerald (Harwick Standard); *Secretary,* James M. Donahue (Goodyear); *Treasurer,* Henry A. Hill (National Polychemicals). Henry S. Anthony (Tyer Rubber) has been named custodian, while Elmer T. Ross (T. C. Ashley) has been appointed chairman of the Hospitality Committee. B. B. Boonstra (Godfrey L. Cabot) has been named a member of the Executive Committee.

In his talk, Mr. Lerner observed that the rapid growth of science and technology in the last few years represents a continuing challenge to the field of high polymers. The need today, he stated, is for scientists and engineers who can think in terms of speeds of 2,000 miles an hour or more.

The speaker went on to cite some of the specific problems involved in the development of polymers for use in rockets. These polymers must be capable of functioning over a range of temperatures from about 1,500°C. to almost absolute zero under high and low pressures or even in a vacuum. In addition, these materials must be able to resist the commonly used fuels, lubricants and chemicals.

Mr. Lerner next discussed the properties and characteristics of the various polymers in use today including the diene polymers, butyl rubber, deuterio rubber, neoprene, the polysulfide rubbers and polyurethane. Particular attention was paid to the silicone, fluoro, graft and stereo-specific polymers.

The growth and future of the rubber industry were next considered by the speaker who pointed out that the rubber industry is "big business", enjoying annual sales in excess of $6 billion. Of this amount, approximately 40 per cent is expended annually for materials, machinery and equipment and services.

Mr. Lerner concluded his remarks by noting that the "full development of science and technology by the entire free world is essential to its economic and military strength and thus to its political stability and advance.

"In the unrelenting competition which faces the entire free world, nothing less than the full and efficient use of the free world's scientific resources will provide the strength it needs. This means better exchange and cooperation between scientists of the free world, including the realm of high polymers."

M. E. Lerner

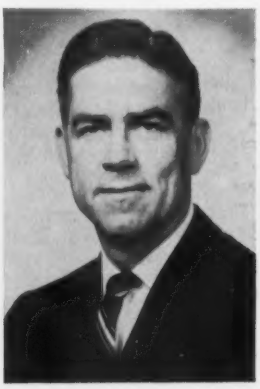
Columbian Carbon Announces Four Appointments

► Columbian Carbon Co., New York, N. Y., has announced that C. O. Davidson has been appointed general sales manager of the Carbon Black and Pigment Division, while J. W. Snyder has been named Carbon Black technical director. Mr. Davidson formerly domestic sales manager, will be in charge of sales of all the division's products in this country and Canada. M. H. Leonard, formerly manager of technical service in the midwestern area, has been appointed sales manager for rubber chemicals and will be located in Akron, Ohio. Mr. Leonard will be succeeded by W. E. Ford. R. H. Marston will continue as district sales manager in charge of the area served by the Akron office and J. A. Gotshall will continue as Akron resident manager.

The Carbon Black Technical Department has been expanded to include new product evaluation under Mr. Snyder with R. A. Emmett as assistant technical director. L. J. Venuto has been named associate technical director and will work on technical service and new product evaluation of industrial blacks and dispersions. H. A. Braendle, appointed associate technical director, will handle development and technical service for the new Columbian black rubber process and L. D. Treleaven has been appointed manager, rubber technical service in the eastern area.

Davidson

Snyder



Leonard

Emmett

Humphreys Cites Growth In Replacement Tire Sales

► In a recent talk before the Annual Convention of the National Tire Dealers and Retreaders Association in Los Angeles, Calif., H. E. Humphreys, Jr., chairman of the board for the U. S. Rubber Co., stated that the replacement tire business is virtually recession-proof and that nothing seems able to slow down its growth. "In spite of everything", he said, it continues to set new records each year. Mr. Humphreys said that the replacement tire business had been expected to level off in the 1958 recession but had increased instead. During 1958, sales of passenger tire replacements are now expected to set a new record of 58 million units, 1.4 million more than the record in 1957 and in 1959, more than 60 million units will probably be sold.

The retreading end of the business is also booming, Mr. Humphreys pointed out, with a new record of 26 million retreaded passenger tires expected this year and further increases projected for the years ahead. At present, there are about 53 million passenger cars on the road compared with 51.5 million a year ago and a further increase of 15 to 20 per cent in automobiles is expected in the next five years.

He stressed that nevertheless, the replacement tire business is still competitive and offers a challenge to the alert tire dealer. The U. S. Rubber chief executive said tire dealers would have to become better managers and concentrate on quality products and services in order to take advantage of the expanding market.

Licensed to Manufacture Kapseal

► Minnesota Rubber Co., Minneapolis, Minn., has been licensed by Bendix Aviation to manufacture "Kapseal," a "Teflon" boot which is used with a standard O-ring in special sealing applications. The Kapseal was developed and patented by Bendix to provide positive sealing with low breakout friction. This is necessary in applications such as guided missiles which have long periods of inactivity on standby or in storage. Company officials said Kapseal gives substantially better sealing without the extremely high breakout force found with metal seals and eliminates the welding effect noted in simple elastomeric seals after long storage. The Kapseal is available in two styles, "Kin" and "Kex." Kin is used in installations where the friction surface is applied to the inside diameter of the seal and Kex, where the outside diameter is the sealing surface. Standard Kapseal sizes range from .125 ID to 7.750 ID for Kin, and .250 OD to 7.750 OD for Kex. They are designed and numbered to match the standard ARP O-rings.

P. W. Litchfield | E. J. Thomas | R. DeYoung

Goodyear Realigns Executive Staff

► Directors of the Goodyear Tire and Rubber Co., meeting in Akron on October 6, elected E. J. Thomas chairman of the board of directors, succeeding P. W. Litchfield, who became honorary chairman. Mr. Thomas continues as the company's chief executive officer. Russell DeYoung, executive vice-president in charge of production, succeeds Mr. Thomas, becoming the company's ninth president. P. E. H. LeRoy, executive vice-president, has been elected vice-chairman of the board and continues as the company's chief financial officer.

Vice-president Sam DuPree moves up as vice-president of production and Richard A. Jay, assistant to the president, replaces Mr. DuPree as coordinator of the company's general managers. Mr. DuPree also was named to the company's Policy Committee which includes Messrs. Thomas, LeRoy and DeYoung, and Victor Holt, Jr., executive vice-president in charge of sales, and Howard L. Hyde, vice-president and general counsel.

Board chairman Thomas joined Goodyear in 1916, was appointed director of personnel in 1926, named superintendent of the California plant in 1928, and returned to Akron in 1930 as assistant to the factory manager. Two years later he was promoted to general superintendent. Assigned to England in 1935 as managing director of the company's operations there, he returned a year later to Akron as assistant to the president. Named executive vice-president and elected to the board of directors in 1937, three years later, he was elected president and in 1956 named chief executive officer and president.

Honorary Chairman Litchfield, with the company since 1900, was factory manager in 1911. Four years later he became a vice-president and was elected president in 1926. He was named chairman of the board as well as president in 1930. He relinquished the post of president to Mr. Thomas in 1940. In his 58 years with the company, Mr. Litchfield has been an important contributor to the rubber industry's progress, as well as in the fields of aviation, aeronautics and transportation.

Mr. DeYoung has been with Goodyear since 1928, serving in supervision in the Akron and Java plants until 1935. During the year 1936 to 1939, he was in Akron with the Technical Service Division. Then, named assistant to the president of Goodyear Aircraft Corp., he was appointed vice-president in charge of production and a member of the board of directors at Aircraft in 1942. Appointed vice-president of production and elected to the board of directors at Goodyear Tire in 1947, he was made executive vice-president in 1956.

Mr. LeRoy joined the company in 1920, was elected assistant treasurer the year following, and treasurer in 1929. He was made a vice-president in 1932 and elected to the board of directors in 1934. He was elected vice-president in charge of finance in 1937 and executive vice-president in 1956.

Mr. DuPree joined the company in 1934, was named development manager at the company's St. Mary's Ohio, plant in 1939 and sales manager there in 1945. Appointed assistant manager of the Industrial Products Division two years later, he was named assistant to the executive vice-president, sales, in 1953 serving as liaison executive for the Industrial, Shoe, Chemical and Metal Products Divisions. A year later he was promoted to general manager, Industrial Products Division and in 1957 was elected vice-president.

Mr. Jay served in the company's Jackson, Mich., plant and later in the Akron plant in industrial products development. Following three years of World War II service with the Navy, he rejoined the company in 1946 in the factory manager's office. Named manager of the company's Lincoln, Nebr., plant in 1948, he was appointed manager of engineering at Akron in 1956, and two years later was promoted to the post of assistant to the president.

134th A.C.S. Meeting Features Many Interesting Papers

► A number of papers of particular interest to members of the rubber industry were presented at the 134th Meeting of the American Chemical Society held from September 7 to 12 in Chicago, Ill. A full report on the proceedings of the ACS Rubber Division appeared in our October issue. At the meeting of the Division of Paint, Plastics and Printing Ink Chemistry, M. Parker, A. S. Powell, O. Kao, and E. G. Bobalek (Case Institute), presented a paper on the "Microstructure of Copolymers of Styrene with Unsaturated Polyesters." This paper dealt with the variable conditions of reaction of styrene with unsaturated polyesters in glass-reinforced plastics and how they tended to produce plastics having poorly reproducible mechanical properties. The authors showed some micrographs of adhesive breaks between glass and polymer which demonstrated the effect of adhesion-promoting surface treatments of the glass.

A paper entitled "Design of Thermosetting Plastics for Improved Impact Resistance" was presented by R. Gelin, R. M. Evans, T. Harris and E. G. Bobalek (Case Institute). The authors said that the search for ways to increase the impact resistance of thermosetting plastics without too much sacrifice of strength and rigidity, poses one of the more critical problems in the design of structural plastics. They went on to say that the objective of attaining an optimum balance of all mechanical properties can be attained more easily through proper design of the reinforcing medium than by modification of the viscoelastic properties of the resinous continuous phase.

Foamed Plastics Discussed

The Symposium on Foamed Plastics featured a number of noteworthy papers, among which was the "Effects of Tertiary Amine Catalysts on Some Foam Properties," by G. T. Gmitter, E. E. Gruber, and R. D. Joseph (General Tire). They reported on some 40 tertiary amine catalysts that were investigated in the polyester-diisocyanate flexible foam reaction and evaluated their activity in terms of foam properties. This team found that amines with beta-amino ethoxy structure are generally slower than most trialkyl amines as regards foam rise. The efficiency of these amine catalysts in improving some polyester urethane foam properties, the authors concluded, is diminished in the presence of some anionic additives.

"Properties of Urethane Foams Related to the Calculated Molecular Weight per Branch Point", was presented by R. E. Bolin, J. F. Szabat, R. J. Cote, Elaine Peters, P. G. Gemeinhardt, A. S. Morecroft, E. E. Hardy, and J. H. Saunders (Mobay Chemical). This paper relates the calculated maximum average molecular distance between branch points and the physical properties of urethane foams. The authors paid special attention to polyether foams and adipic acid polyesters. They presented data that illustrated how tensile, elongation, compression strength, hysteresis, resilience properties, and low temperature flexibility may be related to degree of cross linking through a wide range of branch point distances.

Rigid Urethane Foams

"Designing Rigid Urethane Foams for Low Moisture Permeability," by C. M. Barringer (DuPont), described the excellent insulation efficiency, good structural strength and good adhesion to wide variety of surfaces of rigid urethane foams. By foaming these materials in place, lighter and simpler designs and less costly manufacturing processes are possible for a wide variety of insulated structures. Mr. Barringer reported on the technological aspects that make possible the preparation of rigid urethane foams having low permeability to moisture vapor, which are expected to find wide applications in the field of low temperature insulation.

"Applications of Polyurethane Foams" was presented by Bernard A. Dombrow and Robert E. Weber (Nopco Chemical). They said that the tremendous degree of versatility combined with the decline in the price of materials can be attributed to the rapid and ever-widening growth of the polyurethane foam industry. Rigid and semi-rigid polyurethane foams offer intriguing possibilities because of their physical properties such as good insulation characteristics, buoyancy, high strength to weight ratio, excellent adhesion to most materials and good dielectric and vibration dampening characteristics. The authors discussed a relatively new method of dispensing foam through specially designed two-component spray equipment and other new developments which promise to open many areas for the use of polyurethane foams.

"Expanded Polystyrene" was presented by W. E. Humbert and R. N. Kennedy (Dow Chemical). The authors explained that expanded polystyrene is available in extruded and molded polystyrene foam, with only minor differences in the physical and chemical properties. At comparable densities, extruded material has a slightly higher strength-to-weight ratio and the molded foam has a slightly lower thermal conductivity. Expanded polystyrene is finding use today as low temperature space insulation-plaster base, a buoyancy medium, and in the toy, novelty and display fields, the authors stated.

"Present Status of Latex Foam" was presented by T. H. Rogers and K. C. Hecker (Goodyear). They reported that in some areas of the latex foam industry up to 100 per cent of the product is made from synthetic rubber. Latex foam of 100 per cent synthetic rubber composition has improved long term aging properties as measured by accelerated test methods. The authors said that the all synthetic latex foam can be molded or made into slab stock using conventional equipment.

"Vinyl Foam" was presented by C. S. Yoran and R. J. Stockman (Bakelite). The authors said that vinyl foam is one of the newer elastomeric foams which may be manufactured from polyvinyl chloride resin by means of plastisol techniques. They reviewed the compounding, processing and manufacture of vinyl foam and presented data on the effect of plasticizer concentration on the load deflection properties of the foam as well as the effect of coring on a seat cushion pad.

Plastisol Characteristics

"Plastisol Viscosity-Temperature Characteristics and Their Relation to Formulating" was presented by Harvey Alter (Bakelite). Mr. Alter described a new technique that is said to overcome the difficulties of small scale evaluation of new plastisol formulations for vinyl foam and other plastisol applications. This technique automatically and rapidly measures the viscosity of a plastisol as a function of temperature by means of a Bendix Ultra-Viscoson and thermocouple which provide a means of analysis and assist in the proper selection of ingredients.

"Properties and Applications of Cellular Expanded Products" was presented by E. D. Van Buskirk and R. W. Pooley (U. S. Rubber). The authors described the properties and applications for closed cell products, principally vinyl and vinyl-elastomer blends.

They demonstrated the advantages for nitrile-rubber blend material over the straight PVC compositions in terms of both wider manufacturing tolerances and end uses. The authors used a stress-strain curve under compression in order to illustrate the outstanding load-carrying capacity of a closed cell structure.

"Low Density Cellular Vinyl by Postexpansion Techniques" was presented by D. Esarove and R. J. Meyer (Goodrich Chemical). The authors presented a new technique for the production of low density cellular vinyl that is based on the use of a high decomposition temperature blowing agent incorporated into a vinyl compound. Using existing machinery, a compound containing this blowing agent is extruded or calendered in a normal manner onto a supporting medium. The authors said that the material may be produced and marketed in the expanded form for one type of application, while in another the material is supplied in a form suitable for expansion in place.

"High Density Cellular Vinyl by a Direct Extrusion Method" was presented by R. J. Meyer and D. Esarove (Goodrich Chemical). The authors described a method for the direct extrusion of this cellular product that involves the complete decomposition of a blowing agent within the barrel of the extruder. Expansion occurs at the point of emergence of the plastic mass from the extrusion die. They said that the value of extrusions in which the use of nitrogen gas as a filler may provide advantages over traditional methods of loading can be found in industrial applications such as spline, gasketing and wire and cable separators.

Polymer Chemistry Papers

In the meeting of the ACS Division of Polymer Chemistry, a paper entitled "Stereospecificity in Polymerization and Polymer Crystallinity" was presented by F. E. Bailey, Jr., and R. D. Lundberg (Union Carbide Chemicals). The authors reported on the increasing number of crystalline vinyl polymers that are being discovered as a result of recent developments in polymer chemistry. They discussed the data that were compared with an experimental structure fractionation of polypropylene and the significance of these results in terms of polymerization mechanism.

"Directed Anionic Polymerization and Copolymerization" was presented by A. V. Tobolsky, D. J. Kelley (Shawinigan Resins), K. F. O'Driscoll (Villanova), and C. E. Rogers (Princeton). The authors reported on studies of copolymers produced at low conversions from equimolar mixtures of isoprene and styrene. These studies were carried out using lithium, sodium, and potassium dispersion in hydrocarbon solvents, tetrahydrofuran, triethylamine and diethyl ether. They discussed the mechanism of copolymerization involving a radical ion and the structure of these copolymers.

"Extents of Hydrogen Bonding in Polyamides and Polyurethanes" was discussed by D. S. Trifan (Princeton) and J. F. Terenzi, Jr. (American Cyanamid). The authors reported that the interpretations of structure of polyamides, copolyamides and polyurethanes have been extensively based on assumptions of widely varying extents of hydrogen bonding, using such criteria as melting behavior, physical property variations, and inspection of comparative available hydrogen bonding alignments between parallel polymer chains of perfect, zigzag conformation. They said that such structure interpretations have been completely invalidated through infrared absorption measurements.

"Thermal Decomposition of New Fluorocarbon Polymers" was presented by Sidney Straus and Leo A. Wall (National Bureau of Standards). The authors investigated the thermal decomposition of new commercial and experimental fluorocarbon polymers. Their results indicate that the activation energies for their rates of volatilization are considerably less than that previously found for polytetrafluoroethylene.

► Eastman Chemical Products, Inc., has announced that all Eastman rubber antiozonants will be marketed under the trade name "Eastozone."

James E. Shand

John C. Esher

Allied Chemical Appointments

► James E. Shand and John C. Esher have been appointed manager and assistant manager, chemical sales, respectively, for the newly created Plastics and Coal Chemicals Division of the Allied Chemical Corp., New York, N. Y. Mr. Shand was formerly assistant manager of chemical sales for the Barrett Division from which the new division was formed in July. He joined Allied Chemical in 1946 as a technical representative for Barrett's Chemical Sales Department and served the division successively as special representative, assistant sales manager and assistant manager. Previous to this, he had done extensive research and development work with several manufacturing and consulting chemical firms. Mr. Shand is a graduate of Tufts University, from which he received a B.S. in chemistry. He is a member of the Chemists' Club, the Salesmen's Association of the American Chemical Industry, the American Chemical Society and the Armed Forces Chemical Association.

Mr. Esher was formerly assistant sales manager for chemical sales in charge of tar acids, tar bases and other coal-tar chemicals. He served Barrett in various capacities from 1937 to 1947, when he left the company. In 1956, he rejoined Barrett's Chemical Sales Department as assistant sales manager. Mr. Esher received a B.S. in chemical engineering from Drexel Institute of Technology and attended the New York University School of Business Administration, Columbia University and Rutgers University.

Seminar On:

Time Study and Wage Incentives in Rubber Industry Held in Chicago

► A seminar called "Applying Time Study and Wage Incentives in the Rubber Industry", sponsored by John A. Patton, Management Engineers, Inc., Chicago, Ill., and directed by John R. Walley, consultant for the firm, was held on September 23 to 25 at the Hotel Moraine on-the-Lake, Highland Park, Ill. William T. O'Connor, public relations director for John A. Patton, stated that the purpose of the seminar was to study variables inherent to the rubber industry and their effect on plant operations, time study and wage incentive plans. Topics under discussion included better ways to cut manufacturing costs, improve production scheduling or establish a more reliable basis for product pricing.

Time study and wage incentive techniques were applied to job shop operations as well as to mass production manufacturing in the rubber industry. It was felt that, as in most competitive industries, the job shop operation has greatest difficulty in establishing prices, scheduling work through the shop and keeping costs low enough to be profitably competitive.

Job shop operations are characterized by short runs, small quantity orders and widely diversified products. According to the Patton firm, all producers of rubber products are facing these problems now because of the current tendency of O. E. M. manufacturers, retailers and wholesalers to do business with a smaller inventory.

Management Problems

The three day conference proceeded from fundamentals in wage incentive installation and revision, to current management problems of the companies represented. John R. Walley, of the Patton organization, an expert in time study and wage incentive conducted the seminar, while T. J. Wieczorek, vice-president of the firm, outlined the guideposts essential to a successful incentive revision.

Mr. Walley has directed many Time Study and Wage Incentive Seminars for a wide range of industries. Prior to entering the consulting field, he served in such key management positions as chief industrial engineer, employee relations manager and general manager of manufacturing plants.

In order to provide training in the application of time study and wage incentives so that the operating executive plant manager or industrial engineer might use these managerial tools in solving problems of prices, scheduling and cost control, the topic was divided into four major classifications. These included: (1) How to develop standard elemental data; (2) How to reduce union grievances over time studies; (3) How to cut operating costs through time study and wage incentives, and (4) How to audit and revise wage incentive plans. The program included the following:

What Management in a Rubber Products Plant Expects from Time Study. The purpose of this conference was to broaden understanding of the objectives management wishes to achieve through the use of time study and related activities.

Why Use Standard Elemental Data in a Plant Producing Rubber Products. This was an introductory discussion, including background, which gave the advantages, disadvantages and uses of elemental data in estimating, scheduling and wage incentives.

Arrangement of Time Studies for Standard Elemental Data. Old versus new time studies were discussed, including the preliminary check, comparison sheets and analysis of time values to determine if sufficient data is accumulated. Also discussed were constant and variables.

Development of Wage Incentives when Manufacturing Rubber Products. At this session, reasons were given for using wage incentives. Also presented was information needed for developing wage incentives covering receiving, compounding, mill - room, building, molding, trimming, shipping and other operations. A discussion of allowances and pay curves followed.

Case Studies in Developing Incentives on Rubber Products Manufacturing Operations. Problems encountered in measuring work were described, along with establishing allowance. The group discussed the testing of plans before installation, in order to appraise probable production increases, earnings and savings.

Installation of Wage Incentives. This was a discussion on selling employees, union and management on the use of wage incentives. The group planned means of getting ideas across and determining where to start incentives in a plant.

Maintenance of Wage Incentives. This was a conference on auditing wage incentive plans, practices and policies in plants producing rubber products. There was also a discussion of union time study men and cost of administering incentive plans.

When Should A Wage Incentive Plan be Revised. Eight general signs were given which indicated a deteriorating or failing incentive plan, along with problems to anticipate, contractural limitations and employee fears.

Ten Principles in Successfully Revising Incentive Plans. The ten principles which must be accepted by both management and labor before starting any wage incentive program were presented.

Case Problems—Revising the Existing Wage Incentive Plans. Examples were given and discussions held on actual cases where wage incentive plans have been revised, the problems involved and how they were solved satisfactorily.

Getting the Most Out of Time Study and Wage Incentives. The speaker gave hints and tips to follow in getting the most out of time study and wage incentive plans in a plant producing rubber products.

Aid To Education

► Four companies in the rubber industry contributed $383,245 to education during 1956, according to a survey report published by the Council for Financial Aid to Education, New York, N. Y. Among the four rubber companies, the highest total any one gave to education was $249,429, the lowest was $37,826, and the average gift was $95,811. This donation to education by the rubber companies represented 21 per cent of the total philanthropic contribution made by the four firms. A total of 275 companies furnished usable inquiry forms to the CFAE and an additional 18 other companies made returns which could not be included in the tabulations for technical reasons. Total grants to education for the 293 companies amounted to $36,358,317. It is estimated that all giving by all U.S. business concerns to education during 1956 was approximately $110 million. One of the highlights of the survey is that 99 large companies contributed at a rate of one per cent or more of net income for charitable purposes. Two of these companies were over five per cent for the year. The average rate of giving by companies reporting to CFAE was 0.76 per cent of net income before taxes. This compares with the rate 0.86 per cent for 747,000 companies accounting to the U.S. Treasury Department in 1955.

German Combine Opens Synthetic Rubber Plant

► Germany is about to become self-sufficient in respect to its synthetic rubber needs as the result of the opening last July of a giant production installation in Marl, Germany. Operated by Buna-Werke Huels GmbH, the new plant was designed for a starting production capacity of 45,000 tons, but with technical improvements developed during construction about 70,000 tons may be realized. Company officials said that an annual output of 90,000 tons would be possible with some relatively small changes and that with built-in provisions to double production capacity, the plant may ultimately be capable of 180,000 tons annually.

In 1957, German consumption of rubber totaled 159,000 tons of which synthetic rubber accounted for 45,000 tons and natural for 114,000 tons. Current German synthetic production amounts to 11,000 tons per year. This compares with a United States output of 1,130,000 tons, Canadian 129,000, and a western world total of 1,282,000 tons. Until now, the U. S. and Canada have been the only suppliers of synthetic rubber, the former exporting 183,000 tons, the latter 96,000 tons last year.

In 1938, synthetic accounted for 9 per cent of world total rubber production. Today, it accounts for half and soon will exceed that. Since 1938, the world's production of rubber has increased four-fold. It is anticipated that total consumption will rise to 4,400,000 tons by 1960 and by 1965, western countries alone will consume as much. Per capita world consumption is now almost 2.9 pounds, while the U. S. uses in excess of 20 pounds per capita and Germany about 8¼ pounds.

World Production-Consumption

If the whole world consumed as much as the United States, 24 million tons would be needed annually. Current annual production in the world amounts to 3,680,000 tons of which 1,900,000 is natural and 1,780,000 is synthetic. With the production of natural nearly stabilized at close to two million tons annually, the world will depend on synthetics increasingly.

To produce 80,000 tons of natural rubber more than 125,000 acres and 55,000 people are required and production only can begin eight years after the initial planting. The same quantity of synthetic rubber can be produced on five acres with 1,500 people and production begins two years after start of plant construction. Moreover, most of the rubber plantations are located in politically sensitive areas of the world.

For these reasons, German industry has decided on the new installation. The synthetic rubber plant is operated by Buna Werke Huels GmbH, a firm jointly owned by Chemische Werke Huels AG and Synthese-Kautschuk-Beteiligungs GmbH. The latter company was financed by BSAF, Bayer and Hoechst, three of the giants in the German chemical industry. The plant uses production processes pioneered by Firestone Tire & Rubber Co., Houdry Process Corp. and Esso Research & Engineering Co.

The butane used for synthetic rubber manufacturing comes from German refineries, many of which are owned by U. S. interests. Since butane made in the United States is 2/5 cheaper than that produced in Germany, the price for synthetic rubber in Germany will be higher than that currently being imported from the U. S. However, the German industry, which is operating under government price supports, has committed itself to consume the output of the plant. How much of the price support will be needed is now in question, since production improvements may lower the original cost-per-ton estimate. Production experts anticipate that as the output increases, the cost will eventually be lower than that of natural rubber.

German synthetic consumption, which increased from 11 per cent in 1954 to 29 per cent in 1957, now probably will amount to 40 per cent. In addition to the Huels installation, other plants are being built by Bayer for special types such as Perbunan "N" and "C," oil resistant and flame resistant, respectively.

The German rubber industry consists of 165 plants producing 90 per cent of the output. They employ 90,000 workers and technicians and the yearly volume exceeds $500 million. Exports for the rubber industry total $60 million each year. Two-thirds of its production goes for transportation requirements and tires account for more than 48 per cent of the total business.

► Thiokol Chemical Corp., Trenton, N. J., has been awarded a research and development contract, for work on the Nike Hercules booster engine, by the Department of the Army.

Top row (left to right): Messrs. Behney, Lasser and Greer. Bottom row (left to right): Messrs. Moore, Sancic and Harwick.

Harwick Standard Appoints Six

► Harwick Standard Chemical Co., Akron, Ohio, has announced six key executive appointments. D. F. Behney has been named executive vice-president while William L. Lasser has been named vice-president in charge of operations, and Harvey G. Greer vice-president in charge of technical development.

Jack R. Moore, president of Harwick, was elected president of Republic Dye and Chemical Corp., the manufacturing affiliate of Harwick. Other appointments at Republic were Frank A. Sancic as executive vice-president and Curtis J. Harwick, Jr., as vice-president in charge of technical operations.

The 23 past-chairmen of the Boston Rubber Group who attended the group's 30th anniversary meeting are: Seated, left to right: Messrs. Bierer, Rockwell, Glancy, Sindler, Blake, Noble, Smith, Krisman, Walton, Liddick and Wright. Standing, left to right: Messrs. Steller (incumbent), Williamson, Covell, Malcolm, Bryant, Edwards, Sutton, Capen, Patrick, Reynolds, Atwater and Haas.

Boston Rubber Group Honors Past-Chairmen

► The Fall Meeting of the Boston Rubber Group, held on October 17, at the Somerset Hotel, Boston, Mass., was attended by 320 members and guests who observed the Group's 30th annisary by honoring their past-chairmen. The meeting featured an afternoon symposium on "Resin Modification of Rubber."

The honored past-chairmen were introduced by Roger L. Steller (B. F. Goodrich Chemical), group chairman, who then presented each past-chairman with a special tie clasp engraved with the letters "B.R.G.," and bearing a book-and-gavel emblem with the years of office inscribed. Twenty-three of the 29 past-chairmen were in attendance.

The honored past-chairmen who attended included: John M. Bierer (1929-30), George H. Rockwell (1931), Warren E. Glancy (1932), Jay J. Sindler (1935), John T. Blake (1936), Royce J. Noble (1937), George W. Smith (1938), Emil H. Krisman (1939), James C. Walton (1940), Harold G. Liddick (1941), Donald D. Wright (1942), James E. Williamson (1956), Edwin D. Covell (1955), W. Fraser Malcolm (1954), Alan W. Bryant (1953), Thomas C. Edwards (1951), Harry W. Sutton (1950), Bernard H. Capen (1949), Richard K. Patrick (1948), Charles E. Reynolds (1947), Harry A. Atwater (1945), and Joseph L. Haas (1944).

Absent past-chairmen were Bradley Dewey (1933-34), Laurence R. Clarke (1943), James R. Geenty (1946), John Andrews (1952) and Arthur I. Ross (1957). One past-chairman is deceased, Charles R. Boggs who served in 1928.

W. L. Seamonds (Simplex Wire) was the moderator of the symposium panel which consisted of Robert J. Haberstroh (American Steel and Wire) whose subject was "Resin Modification of Rubber for Wire and Steel"; James W. Ferguson (Durez Plastics) subject, "Contributions made to Rubber Compounds by Phenolic Resins"; and Joseph Cullen (Marbon Chemical) whose subject was "Compounding Effects of High Styrene Resins in Various Rubbers."

John M. Bierer (Boston Woven Hose) gave an after-dinner historical sketch describing the early days of the Rubber Division, ACS, and of the Boston Rubber Group.

Harris Building New Facility

► Harris Products, Inc., Lynwood, Calif., has announced plans to build a new facility adjacent to its existing plant for the manufacture of hydraulic presses and systems for rubber, plastics and general metal working. To employ cost saving methods and the latest in modern plant layout, design features of the new Harris hydraulic presses will be towards greater rigidity and strength, reduced deflection and a substantial saving in over-all prices. John F. Harris, Sr., and John F. Harris, Jr., will head the new concern to be named Harris Machinery Manufacturing Co., while Francis P. Harris, Sr. and Francis P. Harris, Jr. will manage the established Harris Products, Inc.

Argus Introduces Mark LL

► A powerful vinyl stabilizer, named "Mark LL," has been marketed by the Argus Chemical Corp., Brooklyn, N. Y. Company officials said that tests have shown how this new product supplies more heat and light stability and better maintenance of the true tones of sensitive organic pigments, such as lithol rubine or BON reds, than any other vinyl stabilizer available. Mark LL comes in liquid form and is completely soluble in all plasticizers. It can be added directly to the plasticizer for rapid and easy compounding operations. Due to its specific formulations, Mark LL is said to be highly effective in eliminating many of the problems faced by vinyl processors.

Opens New Polyurethane Unit

► Chemical Division of the Thiokol Chemical Corp., Trenton, N. J., has centralized its polyurethane technical service and marketing groups at facilities obtained from the company's Hunter-Bristol Division in Bristol, Penna. At present, Thiokol markets two groups of urethane resins, "Rigithane," a polyurethane foam formulated for thermal insulations, sound absorption and packaging, and "Solithane", for castings, electrical pottings and coatings. Jack Borsellino has been named manager of the company's polyurethane program. Mr. Borsellino joined the company in 1950 as a research chemist and since 1954, has been a group leader in the New Product Section.

Synthetic Production Offsets Natural Shortage

► According to Dr. R. P. Dinsmore, vice-president in charge of research and development for the Goodyear Tire & Rubber Co., who recently addressed the Congress International de Chemie Industrielle in Liege, Belgium, increasing activity in construction of synthetic rubber producing facilities in Europe, Japan and elsewhere throughout the world is an encouraging trend that probably will banish the specter of a natural rubber shortage which was predicted up to a few months ago.

Speaking on "Trends in the United States Rubber Industry," Dr. Dinsmore pointed out that if present estimated ratios of use of synthetic rubber to natural rubber are correct, a shortage of the tree-grown product will not occur, providing present rate of production is not decreased.

Availability of synthetic rubber has a strong bearing on future plans of the U. S. rubber industry. Figures show that there will be a large surplus capacity in the Americas for styrene-butadiene type synthetics, a moderate excess in Eastern Europe and a shortage in Western Europe. Increased capacity in the Americas is expected to come from new butadiene-styrene plants in Central and South America and from polyisoprene plants in the United States and Canada.

While most world areas are becoming more self-sufficient with respect to their synthetic rubber requirements, opportunities still exist to supply both general purpose and specialty types to some parts of the world. Development of new synthetic rubbers in the United States indicates a willingness of manufacturers to provide rubbers to meet new conditions as they arise in industry.

Whatever the results of future commercial maneuvers, Dr. Dinsmore concluded, it is evident that before long industrial countries of the world will be able to meet their rubber requirements with much less dependence upon the vagaries of plantation production in the Far East than has been possible in the past.

Plans Seawater MgO Plant

► Completion of plans for the construction of a new seawater magnesia plant at Port St. Joe, Fla., has been announced by the Michigan Chemical Corp. of Saint Louis, Mich. The new plant, which will enlarge the present natural brine facility at Saint Louis, will provide industry with high-purity chemical and refractory grades of magnesium oxide for use in manufacturing basic brick and other refractory products. Magnesium oxide is used for rubber and neoprene, paper, textile, ceramics, insulation and building materials, catalysts, and for many applications in chemical processes.

C. T. Jansen

addressed the October 24th meeting of the Rubber Chemical Salesmen's Association of Akron.

Purchases Extruder Company

► Farrel-Birmingham Co., Inc., Ansonia, Conn., has announced the purchase of the Electrophysical Engineering Co., Division of National Automotive Fibres, Inc., Orange, Calif., makers of small plastics extruders. Electrophysical has introduced in the California area its line of EPE plastics extrusion machines, which range in screw diameters from 2 to 6 inches and feature "Inductomatic" heating of the stock.

Under the new ownership, sales and service of EPE equipment on the West Coast will continue, and manufacturing will be carried on in the present plant at Orange as well as at the Farrel-Birmingham Rochester, N. Y. plant. Farrel-Birmingham, manufacturer of several lines of heavy machinery and machine tools, is a leading supplier of heavy-duty equipment to the rubber and plastics industries.

Expands Chemical Plant

► B. F. Goodrich Chemical Co., Cleveland, Ohio, has announced that plans have been made for expansion of the recently completed Henry, Ill., chemicals plant. Officially opened last March, the unit was built to produce specialty organic chemicals for use in the petroleum, rubber, plastics and other industries. The company said the expansion is necessary in order to provide facilities for the manufacture of an anti-ozonant chemical for use in the rubber and petroleum industries. Construction of the new addition to the present processing building will begin in September with completion slated for early 1959. Present estimates call for an eventual ten per cent increase in personnel at the Henry plant to operate the new unit.

Rubber Salesmen's Group Hears Jansen on Advertising

► The October 24th meeting of the Rubber Chemical Salesmen's Association of Akron, Inc., held at the University Club in Akron, Ohio, featured an address by Charles T. Jansen, advertising sales manager of RUBBER AGE, on "How Advertising Can Help the Rubber Chemical Salesman." Approximately forty members were in attendance.

In his talk, Mr. Jansen noted that advertising is not a magic force, but is simply a means of communication between a seller and a buyer. He stressed that advertising is a supplement to, not a replacement for, the salesman, and observed that advertising creates prestige for the company.

Industrial advertising, stated the speaker, provides a sound basis for the salesman's calls. Moreover, effective advertising can say many things which an individual salesman cannot. In this sense, advertising furnishes the means for a corporate, impersonal voice to state a case without suffering any of the embarrassment that would come to an individual who tried to do likewise. Another factor to be considered is that advertising may be a company's first introduction to new faces.

Mr. Jansen next touched upon the types of advertising which are likely to do the most good for a given company. Specific and topical industrial advertising—advertising stressing current problems—will be of value to the reader and to the advertiser, he stated.

Mr. Jansen concluded his portion of the program by holding a contest in which members of the audience were asked to guess which of several ads on display from a recent issue of RUBBER AGE registered highest in readership studies. The member of the audience who came closest to the actual score received a pair of tickets to a football game.

Announces Two Appointments

► National Polychemicals, Inc., Wilmington, Mass., has appointed Roy D. Perdue as director of engineering and William M. Meeker as a technical sales representative. Mr. Perdue, a graduate of Yale University, has been with the firm's Engineering Department for the past two and a half years. He had previously been associated with the Springfield Armory, where he had been doing chemical engineering research for the Ordnance Corps. Mr. Perdue has also been associated with the Baker Castor Oil Co. and the Barrett Division of Allied Chemical and Dye Corp.

Mr. Meeker, who will make his headquarters in Wilmington, Mass., was formerly a sales engineer at the Pequonoc Rubber Co. Before that, he served with the Continental Carbon Co., Pawling Rubber Co., and the U. S. Rubber Co. He is a graduate of Virginia Military Institute.

An aerial view of the W. R. Grace & Co. Washington Research Center situated on 150 acres in Clarksville, Md. It ranks fifth in size among the industrial research laboratories in the State, and is the largest industrial chemical research laboratory in the State.

Grace Opens Research Center

► The largest industrial chemical research center in Maryland, and the State's 100th industrial research facility was opened during the final week in October at Clarksville, Md., by the 104-year-old W. R. Grace & Co.

Located 25 miles north of Washington, D.C., the $5 million Washington Research Center of the Grace Chemical Group, brings together 250 scientists and technicians formerly located in three different states.

The new center has been constructed on a 150-acre plot of farmland that permits future expansion. The present two main buildings are the beginning of a research and development center that will eventually be four times its present size.

Grace's WRC has more than 96,000 square feet of floor space; two-thirds of this area is devoted to modern laboratories and complex experimental equipment.

William P. Gage, president of the Grace Research and Development division which runs the WRC refers to the new center as the "hub of our world-wide research and development activities." According to Mr. Gage, the center will augment the many research projects that the Grace Chemical Group has underway in its own facilities throughout the world, as well as with private laboratories and research grants to numerous universities.

The Grace Chemical Group is composed of: Davison Chemical Division, Dewey and Almy Chemical Division, Dewey and Almy Overseas Division, Cryovac Division, Grace Chemical Division, Polymer Chemicals Division and the Grace Research and Development Division.

The WRC is equipped with the latest scientific instruments. It is estimated that having this costly equipment centralized here, will save Grace more than $500,000 a year. Among the important units is the Van de Graaff electron beam generator. This instrument is located in the radiation laboratory which has been built into the side of a hill that serves as a natural barrier for protection from high energy radiation.

The WRC will carry on extensive research with catalysts, polymers, organic chemicals, inorganic chemicals, agricultural chemicals and process and product development.

The Washington area was selected because of its proximity to other important research activities in addition to being close to the huge Davison plant in Curtis Bay, Md. The quiet surroundings and pleasant suburban living were important considerations in keeping and recruiting present and future staff personnel.

The first building completed early this year is four stories in height and has 52,000 square feet of floor space. In addition to 36 offices and 32 laboratories, it houses a library, conference room and a cafeteria.

The second building, completed in September, is two stories high and has 42,000 square feet of floor space. The 32 laboratories included in this building are the most modern and practical in industry based on surveys made by scientists in laboratories throughout the country.

Both buildings are faced in brick with limestone copings and a granite base. Heating, air conditioning and ventilating systems feature direct fresh air intake with no recycling of used air. The center has its own water system and sewerage purification system.

A research physicist at the Washington Research Center determines polymer structure by x-ray defraction.

Over the past eight years, Grace has become an integral part of the chemical industry by merger with well-known chemical firms and by the formation and construction of completely new companies. In these few short years Grace has become one of the 10 largest chemical companies in the United States. Such a rapid rate of growth can only be maintained and insured by recognizing the value and the need for a strong research effort to create new ideas for tomorrow's products.

In creating the central research laboratories, the management of Grace recognize that the future growth of any company lies in its ability to generate new ideas leading to new products from within. Such growth through advances in technology helps to keep a company strong by making it self-sustaining in meeting the challenge of change.

P.C.I. Reorganizes Development

► A new Development Department will be organized by Petroleum Chemicals, Inc., New Orleans, La., in order to expand current research activities into the manufacture of new chemicals from petroleum and to develop new manufacturing projects for the company. The department will be organized into three divisions. Research, Projects Analysis and Market Analysis, which will study markets for chemicals, methods for producing them and will also prepare recommendations for future manufacturing projects. Dr. Howard L. Malakoff, head of the company's Technical Department since 1954, will head the Development Department, reporting to the executive vice-president, F. M. Simpson. The Research Division, operations of which will be centered at Lake Charles, will be headed by Dr. J. C. Kirk, presently director of research. The Market Research Division and Projects Analysis Division will be located in New Orleans. A. L. Regnier will head the Projects Analysis Division.

Midwest Report Wins Award

► Midwest Rubber Reclaiming Co. of East St. Louis, Ill., in an annual competition sponsored by the publication *Financial World*, has won a bronze "Oscar" for the best financial report published by a rubber company in 1957. U. S. Rubber Co., New York, N. Y., placed second in the competition, while the Goodyear Tire & Rubber Co., Akron, Ohio, placed third. The award to the company was accepted by Howard R. Painter, vice-president, at the Annual Award Dinner held at the Astor Hotel in New York City on October 27. At the ceremony, Mr. Painter received the bronze plaque. In past years, Midwest has won several "honorable mentions" in the annual competition.

New York Elects Officers; Holds Radiation Symposium

► Approximately 190 members and guests of the New York Rubber Group attended the Fall Meeting held on October 17 at the Henry Hudson Hotel in New York City. The meeting featured an election of officers for the new season and a panel discussion on "Radiation and Rubber." At a banquet which followed the technical portion of the meeting, Leonard C. Komar (Titanium Pigments), chairman of the Education Committee, was presented with a movie projector in recognition of his services to the group.

Members elected to the office for the new season include: *Chairman,* R. B. Carroll (R. E. Carroll); *Vice-Chairman,* Ervin S. Kern (R. T. Vanderbilt); *Secretary-Treasurer,* Robert Seaman *(Rubber World),* and *Sergeant-at-Arms,* E. F. Heckman (Raw Materials). Members elected to the Executive Committee included: W. J. O'Brien (Seamless Rubber), E. C. Strube (Crescent Insulated Wire), A. H. Woodward (DuPont), and Bryant Ross (Pennsalt Chemicals).

The first paper presented at the symposium was a "Review of Atomic Concepts" by D. S. Ballantine, Brookhaven National Laboratory, Upton, N. Y. The speaker pointed out that there are three classes of particles — charged, neutral and heavy. He discussed the similarities and differences which exist between particle types and discussed the interaction of charged particles with matter.

Other topics covered by the speaker included the classification of neutrons according to energy, the phenomenon of elastic scattering, slow neutron reaction with matter, and the rate of neutron reaction. He also touched upon some commonly used radiation sources and the characteristics associated with their radiations.

Radiation Vulcanization

Dale Harmon, B. F. Goodrich Research Center, Brecksville, Ohio, presented the next paper, this one entitled "Radiation Vulcanization of Elastomers." The speaker outlined the history of radiation curing and discussed the advantages of the system. In this type of process, he stated, vulcanization can be accomplished without the use of vulcanizing agents, thus reducing costs. In addition, cold vulcanization of extruded goods can be accomplished and uniform cures can be obtained in thick items which are difficult to cure uniformly by conventional means.

While it appears that radiation vulcanization will not be competitive costwise with conventional vulcanization within the next ten years, considerable savings can still be accomplished through the elimination of such items as curing pits, molds and curing ovens. The engineer will also be able to revise his production line to capitalize on the high-speed continuous flow advantages of radiation cures.

The third paper presented at the symposium was concerned with "Radiation Damage to Elastomers." The author, W. R. Griffin, Wright Air Development Center, Dayton, Ohio, stated that nuclear energy is an attractive source of power. To utilize this energy, however, secondary systems are needed which often contain rubber parts.

High energy radiation is a severe environment for elastomers and causes an upset in the amount of cross-linking in the polymer network. Oxidation, a major portion of the observed radiation damage, can be greatly reduced by antirads. These, more than antioxidants, possess other damage inhibiting qualities that make them a valuable means of protecting today's elastomers. A blanket of nitrogen gas also has antirad qualities. Analyses of gases liberated during the irradiation of elastomers reveal that highly branched polymers are less stable than the linear types.

Compression set, the property most sensitive to damage by radiation, combines the effects of cross-linking, chain scission and loss of branch chains. Design and selection of materials as well as exclusion of oxygen will extend the useful life of elastomers in this severe environment, he stated. Mr. Griffin pointed out that the real solution would be the development of radiation resistant polymers.

At the conclusion of the banquet a program of entertainment was presented by Dr. H. Walter Grote, president of the Continental Machinery Co. and a member of the New York Rubber Group. With an act entitled "Grotesques of the Mind," Dr. Grote presented a demonstration of thought control, mind reading and extra-sensory perception.

► Precision Equipment Co., 4401 N. Ravenswood Ave., Chicago 40, Ill., has issued a new edition of the company's "Wall Chart of Conversion Factors."

Victor J. Baxt

Allen E. Polson

Baxt and Polson in New Offices

► Thompson Chemical Co., Pawtucket, R. I., has announced the election of Victor J. Baxt to the office of vice-president and general manager, and the appointment of Allen E. Polson to the newly created position of director of sales.

Mr. Baxt received his B. S. degree in chemistry at the University of Rhode Island in 1938 and was awarded an M.A. degree in chemistry by Duke University in 1940. In 1944 he took special courses at Princeton and M.I.T. From 1940 to 1944, he was associated as research chemist with Alrose Division of Geigy Chemical Co. During World War II, Mr. Baxt served in the U. S. Navy with the rank of lieutenant. After the war he joined the Thompson Chemical Co.

Mr. Polson is a graduate of the University of Minnesota, where he obtained his chemical engineering degree. He also studied patent law at Columbia University. Mr. Polson has devoted his entire business career to the plastics and synthetic polymer industries. Associated with DuPont in various capacities including research and patent law, he has most recently been connected with the Goodyear Tire & Rubber Co., holding the position of manager of sales service for the Chemical Division. For the past five years he was Manager of the Plastics Department in Goodyear's Chemical Division.

Names in the News

Walter F. James, who has been with the firm for 22 years, has been appointed manager of the Export Division of the Neville Chemical Co., Pittsburgh, Penna.

Max D. Liston has been named director of engineering for Beckman Instruments, Inc., Fullerton, Calif. At the same time, **Thomas V. Parke** and **Earl C. Janson** have been named directors of product standards and manufacturing, respectively.

Roger E. Caffier has been named chemical sales representative for the Cleveland area for Plastics and Coal Chemicals Division, Allied Chemical Corp.

H. H. Wiedenmann, production manager of North American tire plants for the Firestone Tire & Rubber Co., has marked his 30th anniversary with the firm.

Glen E. Wilson, previously director of employee relations for Goodrich-Gulf Chemicals, Inc., has been appointed director of employee and public relations for the company.

Robert H. Lane, formerly vice-president and account executive for Carl Byoir & Associates, has been appointed director of public relations for the Goodyear Tire & Rubber Co.

Ross W. Bennington has been promoted from general traffic manager for the U. S. Rubber Co., to director of traffic, succeeding **James W. Harley,** who has retired after 39 years of service with the company.

George W. Schwarz, vice-president of Wyandotte Chemicals, has also been elected treasurer of the company, while **Donald R. Hibbert** has been named controller and assistant treasurer, succeeding the late **Donavan J. Gray.**

Bogardus Werth, who was formerly associated with the Virginia Carolina Chemical Corp. as assistant sales manager for agricultural chemicals, has been appointed to the chemical sales staff of the Michigan Chemical Corp.

Richard H. Mather, formerly production manager for International Firestone, has been named vice-president in charge of production for that organization.

John L. Collyer, chairman of the board for the B. F. Goodrich Co., will again serve as a member of the United States Olympic Businessmen's Committee endorsing the nation's participation in the 1960 Olympic games.

B. F. Benson, previously supervisor of the Tire Cord Evaluation Laboratory for the Industrial Rayon Corp., has been appointed market development manager of the company's Industrial Products Division.

Jack Dickstein, a research chemist formerly associated with Lederle Laboratories and E. R. Squibb & Sons, has joined the forest products section of the Central Research Laboratory for the Borden Chemical Co.

Harold J. Michel, general manager of the Film Division and **Paul E. Hill,** director of manufacturing for the Fibers Division for American Viscose Corp., have been elected vice-presidents.

Louis W. Munchmeyer, assistant general manager of the Michigan Alkali Division for Wyandotte Chemicals, has been elected vice-president in charge of industrial chemical manufacturing for the company.

Glenn B. Warren, vice-president and consulting engineer for the Turbine Division of the General Electric Co., has been elected president of the American Society of Mechanical Engineers.

John J. Keilen, Jr., previously director of development for the Polychemicals Division of West Virginia Pulp & Paper, has joined Charleston Rubber as director of research and development.

S. S. Skelton, president of the S. S. Skelton Co., has returned from a European tour during which he visited eight countries, including Belgium, where he visited the World's Fair in Brussels.

John J. Sheehan, who has been associated with Hewitt-Robins, Inc., since 1947, has been appointed general manager of the company's International Division, succeeding **Harold Von Thaden,** who is retiring but will continue to serve the company as a consultant.

R. William Raas, who was previously associated with Johns-Manville, has joined the John Waldron Corp. as a sales engineer in the Machinery Division.

E. P. Schrank, manager of production and engineering at the Seiberling Rubber Co., has been elected chairman of the Akron Section of the American Society of Mechanical Engineers.

George J. Sella, Jr.

Named Product Manager

► George J. Sella, Jr., who has been associated with the company since 1954, has been appointed a product manager for the Rubber Chemicals Department of the American Cyanamid Co., New York, N. Y. To be in charge of the commercial development of antioxidants and chemicals for the synthetic rubber industry, Mr. Sella has served the company in various capacities in the technical development, production and sale of rubber chemicals. A native of New Jersey, he is a graduate of both Princeton and Harvard Universities. He is a member of the American Institute of Chemical Engineers and the American Chemical Society.

Kenneth R. Anderson, formerly secretary of the sales production coordination committee of the executive department for the U. S. Rubber Co., has been appointed assistant manager of sales production coordination for the company's Tire Division.

William T. Kays, who was previously associated with American Cyanamid, has been named Midwest technical sales representative for Holland Color and Chemical Co.

H. Gordon Fromm, formerly vice-president of manufacturing for the International Latex Corp., has been named vice-president of operations for the company.

John H. Woelflein has been appointed technical sales representative for Vibrin polyester resins in the Boston and New York areas for the Naugatuck Chemical Division of the U. S. Rubber Co., while **Lawrence A. King** has been named Vibrin polyester plastic technical representative in the Los Angeles area.

Thomas L. Bonnitt, formerly associated with National Dairy, has been appointed manager of Market Development at Morningstar-Paisley, Inc.

John D. Fennebresque

Named President of TB&CC

► John D. Fennebresque has been named president and chief executive officer of the Texas Butadiene & Chemical Corp., Houston, Texas, succeeding E. L. Green, Jr., who will continue as a director and member of the executive committee. Mr. Fennebresque also becomes a director and member of the executive committee. Previously associated with the Food Machinery & Chemical Corp., Mr. Fennebresque was one of that company's executive vice-presidents and a member of the board of directors. His past experience includes the position of vice-president and director of Celanese Corp. of America, for which he served as general manager of the Chemical Division. For two years, during World War II, he was in the office of the rubber director of the War Production Board and he has also served on the chemical and rubber advisory committee of the Department of Commerce and as a director of the Manufacturing Chemists Association. Mr. Fennebresque is a member of the American Institute of Chemical Engineers, the American Chemical Society, the Society of the Chemical Industry and the planning council of the International Management Association.

Hi-Sil Price Reduction?

► According to reports in the Akron area, the Columbia-Southern Chemical Corporation stands ready to reduce the price of Hi-Sil 233, its precipitated hydrated silica, to 7½c a pound, f.o.b. Barberton, Ohio, to any rubber goods manufacturer willing to contract for a minimum of 10,000 tons a year on a firm basis. These reports further indicate that Hi-Sil at the lower price will deliver into either the Akron or Detroit areas at a lower pound-volume cost than bulk HAF black at 7¼c a pound, f.o.b. Texas. Several tire manufacturers in and around the Akron area are believed to be carefully evaluating potentials offered by the new price structure.

Neville Producing Indene

► Neville Chemical Co., Pittsburgh, Penna., is producing "indene" (C_9H_{10}) in pilot plant quantities for commercial research applications. Although indene has been known for 70 years, the company said this is the first time it has been produced in pure form in semi-commercial quantities. Indene has two reactive centers: the double bond and the methylene hydrogen of the five membered ring. It is a new reactive monomer and basic chemical.

The high purity indene is an almost water white, non-polar liquid with a boiling point of 182°C., a freezing point of —3.5°C. and a specific gravity of .993. While indene polymerizes slowly at ambient conditions and reacts with atmospheric oxygen, the company said it can be inhibited and handled with as much ease in a chemical plant as styrene. Indene has the general properties of benzene with an unsaturated side chain and thusly, adds halogens and halogen acids.

When the reactive positions in the C_6 ring are suitably stabilized, characteristic substitutions on the benzene ring are possible. indene will undergo a large number of other type reactions to produce a host of indene and indan derivatives. These derivatives can be used in the fields of bi-functional monomers, surface active agents, medicinals, antioxidants, plasticizers, insecticides, dyes and a long list of others.

Marbon Announces Appointments

► Marbon Chemical Division, Borg-Warner Corp., Gary, Ind., has announced that D. M. Pratt has been named sales manager in charge of an expanded sales program for rubber reinforcing resins, paint resins and "Ty Ply" adhesives products. At the same time, William A. Suiter, who recently joined the organization, has been appointed sales manager for "Cycolac", thermoplastic resin. Mr. Suiter was formerly in a sales management position with the Panelyte Division of St. Regis Paper Co. Both men will headquarter at Marbon's new administrative and research facilities located in Washington, West Va.

Bellanca to Liquidate

► Shareholders of the Bellanca Corp., Wilmington, Del., have voted to liquidate the company's only remaining operating division. Bellanca plans to sell the inventory and two plants of its L. Albert & Sons Division in Akron, Ohio, and Trenton, N. J., some time next year. The division operates plants for rebuilding rubber and plastic-making machines. The only remaining facility, a plant in Los Angeles, will remain operating as long as it is possible to do so on a profitable basis.

John J. Gorman

Assigned to New DuPont Post

► John J. Gorman has been named technical sales representative for the Elastomer Chemicals Department of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and will serve in Missouri, Arkansas, Kansas and parts of Mississippi, Illinois, Tennessee and Indiana from headquarters in St. Louis, Mo. Mr. Gorman is a chemical engineering graduate of Villanova University and has done graduate work at the Drexel Institute of Technology. After leaving college, he joined Rohm and Haas Co. at the Redstone Arensal at Huntsville, Ala., and later, he was assigned to the Philadelphia research laboratory. He entered sales work in 1952 with the Milton Roy Co., a metering pump manufacturer. Mr. Gorman joined DuPont as a rubber compounder in the Elastomer Laboratory in 1955 and has been assigned to sales work in the Wilmington office for the past two years.

Naugatuck Vibrin 136A

► Naugatuck Chemical Division of the U. S. Rubber Co., Naugatuck, Conn., is starting commercial production of what is said to be the highest heat-resistant polyester plastic developed. Designated "Vibrin 136A", the plastic will withstand a sustained temperature of 500°F. and a peak load of 1000°F. for short periods of time, the company reports. It has approximately twice the heat resistance of previous polyester plastic resins used primarily in reinforced plastic application and its radar transparency is approximately ten times better than that of conventional polyesters. Vibrin 136A, already in limited use as a radome material in jet bombing planes, is said to have high mechanical strength when exposed to elevated temperatures and exceptionally good high-frequency electrical properties. The new material is the result of basic research and development by Boeing Airplane Co. and the Naugatuck Chemical Division of the U. S. Rubber Co.

Manufacturing rubber buckets in Puerto Rico.

Puerto Rican Rubber Industry Shows Rapid Growth Pattern

► A recent report published by the U. S. Department of Labor delves into the status of the chemical, petroleum, rubber and related products industry in Puerto Rico. This special report, prepared by the Wage and Hour and Public Contracts Divisions of the Office of Wage Determinations, probes into the problems encountered by rubber manufacturers on the island, the majority of whom are engaged in rebuilt-tire or rubber-soled footwear manufacturing.

Most of the employees within this industry fall within a current minimum wage rate of 85c per hour. Under Puerto Rican law, firms engaged in manufacturing are generally entitled to a complete exemption from income taxes, license fees, certain excise taxes and other levies imposed by the Commonwealth and municipal governments of Puerto Rico, for a period of ten years from the commencement of operations.

The survey selected information on the thirteen firms engaged in rebuilding and vulcanizing tires and tubes in Puerto Rico. Since the last previous survey in 1957, Caribe Tire Recapping Corp. and Paga & Co. have been added to the list of tire vulcanizers. Three of the firms were affiliated with other companies; two with U. S. mainland concerns and one with a Puerto Rican firm. The 13 firms began operations in the years dating from 1937 to 1957. Operations of the firms in general were reported as not being seasonal, although the greatest activity occurs from January through June.

None of the 13 firms is tax exempt and none had collective bargaining agreements with employee unions. Raw materials used in tire rebuilding and vulcanizing generally include cushion gum, tread rubber and gum, nylon and rayon cord fabrics, stripping and padding stock, vulcanizing cement, rubber solvents, patches, curing tubes, and part of the carcasses. Except for a very small per cent, tires to be repaired are supplied by the customers. Plant equipment usually used by these firms consists of retreading or recapping molds; vulcanizing molds; buffing machines; spreading machines; electric drills, and air compressors. In a small percentage of cases tires for vulcanizing are acquired by firms with retail establishments as a trade-in on new tires. Five of the 13 firms also operate retail or wholesale establishments for selling new and used tires and tubes. In most of these cases such activity constitutes the majority of the total business activity.

Number of Workers Employed

Employment in the 13 firms engaged in rebuilt and vulcanized tires amounted to 128. Information on profit and loss was reported for seven firms in that division in 1956, and three firms in 1957. The seven firms in the 1956 report all showed a net profit, and the 1957 report showed a net profit for two of the firms and a net loss for the third. For the three firms reporting in both years, combined net sales declined from $512,600 in 1956 to $476,500 in 1957. The ratio of wages to net sales for these three firms increased from 14.6 per cent in 1956 to 19.2 per cent in 1957, and profits declined from 19.2 per cent of net sales in 1956 to 18.4 per cent in 1957.

In the Rebuilt and Vulcanized Tire Division, balance sheets are available for eight identical firms for two accounting periods. Four of these show an increase in net worth in the second accounting as compared with the first, one reduced its deficit net worth, one had a decrease in net worth, and two showed no net worth figures in their balance sheets.

During the past year several projects have been announced for the manufacture of various rubber products. The Hamilton Kent Mfg. Co., of Kent, Ohio is planning to establish a factory to make rubber pipe couplings and other molded and extruded rubber-like products. The Carolina Rubber Mfg. Corp. has been formed by Heinrich Wilhelm of Frankfurt, Germany for the manufacture of rubber fittings and parts with machinery and equipment valued at $16,250. Albert Van Dam of the Van Dam Rubber Co., Bronx, N. Y. expects to begin operations during the year in a rubber balloon factory.

A grant for tax exemption has been issued to Tropic Foam Inc., in Hato Rey, to manufacture urethane foam in sheets or slab stock with machinery and equipment valued at $58,300. This company, which is a Fomento-promoted plant, was reported to have started operation in November 1957. Possibilities of establishing a tire factory in Puerto Rico have been surveyed by the Seiberling Rubber Export Co., a division of Seiberling Rubber Co. of Akron, Ohio.

Production of Footwear

Two companies in Puerto Rico were producing casual-type rubber footwear for export at the time of the recent survey. They were the Coastal Footwear Corp. and the Moda Shoe Corp. An additional firm, the U. S. Rubber International Corp. was also producing rubber footwear, but was not included in the survey because its entire production was sold locally. Coastal Footwear started the production of children's and men's rubber-soled footwear in 1953, and is tax exempt. The firm is connected through common stock ownership by its principal stockholders with the Converse Rubber Co., Malden, Mass., a major rubber footwear maker.

All basic raw materials, which include duck cloth, insole material, raw rubber, chemicals, thread, laces and eyelets, and paper box supplies are procured from different sources on the mainland. Approximately three fourths of the firm's total output is sold to various customers on the mainland, while the remainder is sold to local

customers. The firm reported operations as seasonal, with the peak period of employment in the months of November to May and a slack period the remaining months of the year. Between the peak and slack periods, employment varies from 155 to 120 workers. Employees of the firm are organized by the Union de Empleados de Production de la Coastal Footwear (Ind.).

Moda Shoe Corp. began operations in 1956 and is tax exempt. The firm is presently producing children's zip boots, cowboy boots, and slippers. It is affiliated with the Wellco Shoe Corp., Waynesville, N. C., a manufacturer of casual-type footwear. Rubber, rubber chemicals, leather, corduroy, brocade, terry cloth, felt, wadding, lining materials, binding tape, gores, small supplies, and packaging materials are secured from the mainland for the production of footwear. Corrugated cartons are secured in Puerto Rico. Operations include mixing and compounding rubber with various chemicals; cutting and shaping upper material, findings, and leather outsoles; stitching or otherwise securing upper materials, findings and outsoles together; molding the sole and simultaneously vulcanizing it to the upper; finishing; inspecting, and packing.

The finished production is shipped to Waynesville, where it is distributed by Wellco under its trade name "Foamtread." As of payroll periods ending March 1958, the two firms producing rubber footwear employed a total of 211 workers. In the 1956 and 1957 surveys, total covered employment for these same firms amounted to 183 and 187, respectively. Average straight time hourly earnings of the 211 workers employed by the two firms in the recent survey were 82.9c. Balance sheet data covering two accounting periods show that both firms increased in net worth in the more recent period, and that the increases appear to be attributed to earnings.

Foreign Competition

Rubber-soled footwear is the one item in the Puerto Rican industry in which foreign competition has been of major concern. As in the case of other products, the volume of foreign imports is quite small compared with total United States production. However, at the price levels in which these items compete, the volume of imports is substantial, and is seriously competitive with both mainland and Puerto Rican products. In 1957, the total value of imports of rubber-soled shoes with fabric uppers amounted to $1.1 million.

By way of comparison, U. S. production of rubber footwear in 1956 amounted to $209.1 million. Since 1951 imports of these products have increased steadily in value each year, with the exception of 1954, and in the last three years have increased at an accelerated pace. Between 1955 and 1956, for example, imports of rubber-soled shoes with fabric uppers more than doubled in value, increasing from $152,000 to $344,000, and between '56 & '57, imports more than tripled, increasing from $344,000 to $1,123,000.

In a petition to the United States Tariff Commission in September 1957, seventeen manufacturers of rubber footwear in the United States contended that France, Japan and Hong Kong were sources of competition in three specific types of footwear. Lower labor costs were considered responsible for the cheaper price of rubber footwear from these countries, the price being one half that of similar footwear manufactured in the U. S.

Tax rates for rubber-soled footwear imported into the United States vary according to the type of upper. Rubber-soled footwear with fabric uppers or with uppers whose chief value is fabric are subject to an import duty of 20 per cent *ad valorem* of the American selling price. Rubber-soled footwear which is wholly or chiefly in value of rubber, is subject to a duty of 12½ per cent of the selling price. Rubber soled footwear with uppers made entirely, or in chief value, of leather are subject at the present time to a duty of ten per cent of the foreign value for men's, youths' and boys' shoes, and a duty of 20 per cent of the foreign value for other shoes.

At a hearing before Industry Committee No. 32-A, industry representatives expressed concern over competition from importers allegedly managing to avoid higher tariff duties by superimposing leather pieces on the upper part of the shoes. By this practice, it was claimed, a predominately rubber-soled shoe with fabric upper may be designated as rubber soled shoe "in chief value leather" and therefore be subject to a tariff of ten per cent of foreign value instead of 20 per cent of American selling price.

Subsequently, a bill was introduced in Congress which would plug this apparent loophole. On June 11, 1958, after passing both houses of Congress, the bill was signed by the President and became law, effective on a date to be set by the President, not later than September 1, 1958. Accordingly, the criteria for tariff classification under this amendment is the rate applicable for "the greater area" of material used in the upper, rather than the chief value of such material.

Statement

► Tax-free Puerto Rico today is the land of opportunity particularly for rubber fabricating. Based on feasibility surveys prepared by EDA economists and current negotiations with U.S. rubber products manufacturers, I would say that opportunities are both solid and good in skin diving equipment, bathing caps, hot water bottles, sneakers, basketballs, footballs, tennis balls, and hundreds of similar products that are relatively lightweight and thus comparatively economical to ship to the Stateside market.

U.S. rubber products manufacturers seeking out the 50,000,000 man Caribbean market should keep their eye on Puerto Rico. The Commonwealth is in an excellent position to reach both this market and the far bigger market in Latin America.

Hector E. Pineiro
U.S. Industrial Promotion Director
Economic Development
Administration
Commonwealth of Puerto Rico

Two New Bakelite Compounds

► Bakelite Co., New York, N. Y., has announced the development of two new rigid polyvinyl chloride plastics which are said to permit extrusion twice as fast as conventional rigid polyvinyl chloride compounds. The materials were engineered particularly for pipe and contour extrusion applications and are said to represent the latest additions to the family of vinyl plastic materials supplied by Bakelite. They are free flowing, have good gloss characteristics and have been listed by the National Sanitation Foundation as suitable for making pipe that will carry drinking water.

"QGD-5020" was designed for high impact strength and, in extruded form, it is said to have an Izod strength in the range of 20 to 30 pounds per inch of notch. It also offers ease of fabrication and exhibits good weatherability and chemical resistance. "QGD-5010", developed for extreme chemical resistance, will withstand contact with many strong acids, alkalies, metallic and ammonium salts, alcohols and aliphatic hydrocarbons, Bakelite claims.

Interests In Glyco Sold

► H. Bennett and E. Rosendahl have sold their interests in Glyco Products Co., Inc., which will be continued under the name of Glyco Chemicals Corp., New York, N. Y. Both Mr. Bennett and Mr. Rosendahl will act in a consulting capacity for Glyco and Mr. Bennett will continue as editor in chief of the Chemical Formulary. On September 5, Mr. Bennett departed with a number of members of the Society of Cosmetic Chemists to attend various scientific symposia and visit the plants and laboratories of certain manufacturers in Italy, Germany, Denmark, Holland and Belgium.

Financial News

Industrial Rayon

► Nine months ended September 30: Net loss of $2,420,656, which is equal to a loss of $1.31 per share of common stock, compared with a net income of $946,559, or 51c per share, in the first nine months of the preceding year. Sales in the 1958 nine month period totaled $32,625,073, compared with $43,167,-236, during the same period last year.

National Starch

► Nine months to September 30: Consolidated net income of $2,127,171, which is equal to $2.15 per common share, compared with $2,073,734, or $2.11, a share, in the 1957 nine month period. Consolidated net sales in the first nine months of this year totaled $33,891,886, compared with $33,093,-441 during the same period last year.

Firestone

► Nine months ended July 31: Estimated net income of $35,118,046, which is equal to $4.16 per share of common stock, compared with $44,-583,808, or $5.40 a share, in the equivalent nine month period last year. Sales at the third quarter of 1958 totaled $38,898,356, compared with $844,603,697, during the same period of the preceding year.

Triangle Conduit

► Eight months ended August 31: Net income of $1,496,848, which is equal to $1.10 per share, compared with $2,-325,271, or $1.71 a share, in the first eight months last year. Gross sales during the eight month period of 1958 totaled $38,898,356, compared with $41,501,534, during the same period last year.

Mansfield Tire

► Eight months ended August 31: Net income of $1,348,466, which is equal to $2.37 per common share, compared with $758,363, or $1.37 a share, a year earlier. Net sales in the first eight months of this year totaled $43,569,878, compared with $41,030,027, during the same period last year.

Sheller

► Six months to June 30: Net loss, after tax credit, of $163,832, which is equal to 17 cents per share of common stock, compared with a net income, after taxes, of $1,152,963, or $1.21 a share. Sales in the 1958 first half totaled $12,852,521, compared with $22,375,-385, in the corresponding period of the preceding year.

Lee Rubber

► Nine months ended July 31: Estimated net income of $1,184,858, which is equal to $1.40 per share, compared with $1,203,350, or $1.42, during the 1957 nine month period. Net sales in the nine months to July 31 totaled $32,747,548, compared with $34,119,-316, during the same period last year.

General Tire

► Nine months to August 31: Net income of $5,331,938, which is equal to 91c per share, compared with $8,545,-592, or $1.61 a share, in the fiscal nine month period of the preceding year. Sales in the nine months to August 31 totaled $321,405,954, compared with $311,901,049, during the same period last year.

Armstrong Cork

► Nine months to September 30: Net income of $9,534,000, which is equal to $1.82 a share, compared with $8,428,000, or $1.60 a share, in the first nine months of 1957. Sales in the first nine months of 1958 totaled $182,530,000, compared with $185,-658,000 during the same period last year.

Eagle-Picher

► Nine months ended August 31: Net income of $1,319,860, which is equal to $1.31 per share, compared with $3,335,-983, or $3.32 a share, in the corresponding period of 1957. Sales in the first nine months of the year totaled $70,127,694 compared with $90,188,-629 in the corresponding period a year ago.

Thiokol Chemical

► Nine months to September 30: Net income of $1,735,581, which is equal to $1.38 a share, compared with $1,317,219, or $1.09 a share, in the first nine months of 1957. Net sales in the first nine months of 1958 totaled $54,607,976, compared with $39,026,-522 in the same period last year.

Mohawk Rubber

► Nine months to September 30: Net income of $790,000, which is equal to $4.66 a share, compared with $372,000, or $2.19 a share, in the same period of 1957.

Faultless Rubber

► Year to June 30: Net income of $322,331, which is equal to $2.26 per share, compared with $391,876, or $2.75 a share, in the preceding year.

Markus D. Royen

Elected Vice-President

► Markus D. Royen has been elected vice-president and director of research for the Apex Tire & Rubber Co., Pawtucket, R. I. Dr. Royen obtained his early education in Poland, and advanced training in the Institute of Technology in Danzig, Germany, where he received his diploma in Chemical Engineering. He took additional technical courses abroad and in this country in rubber and plastics.

Dr. Royen has had long international professional experience in chemistry and in production in his fields. Before World War II, he was chief chemist and production manager for the rubber firm "Gentleman" at Lodz, Poland, the largest such factory in that country. His first U. S. association was with the H. O. Canfield Co. in Bridgeport, Conn., where he worked in research on synthetic rubbers. He joined Apex Tire & Rubber in 1945.

Canada Wire

► Six months to June 30: Net income of $70,000, which is equal to 7c per class B share, compared with $711,000, or 68c a share, in the 1957 first half. Per share earnings were computed after Class A dividend requirements had been provided for.

Garlock Packing

► Six months ended June 29: Net income of $171,735, which is equal to 34c per share, compared with $1,059,-508, or $2.14 a share, in the first six months of 1957.

General Cable

► Nine months to September 30: Net income of $4,803,938, which is equal to $1.60 per common share, compared with $9,156,539, or $3.15 per share, in the equivalent period of 1957.

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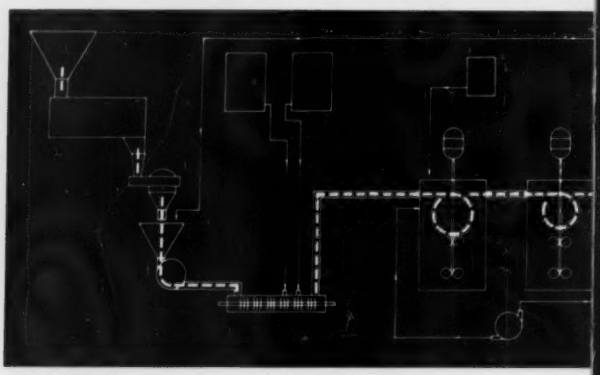

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STATEX-93 HMF High Modulus Furnace
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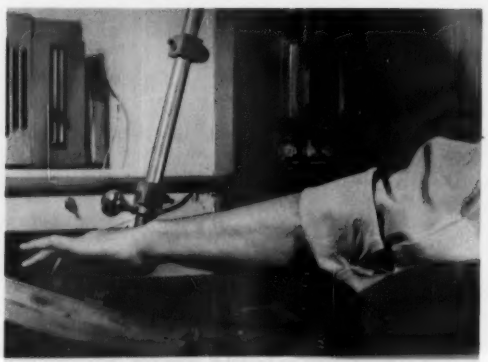

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Broadens Poly-Dispersion Line

► Wyrough & Loser, Trenton, N. J., have broadened the line of "Poly-Dispersion" rubber chemicals that are said to offer the maximum in chemical dispersion, uniform cures and processing and handling safety. The Poly-Dispersions are solid form dispersions of rubber chemicals in polyisobutylene binders. They are packaged as slabs approximately ⅜ x 9 x 18-inches, lightly dusted with micronized talc and separated from each other by polyethylene liners in completely taped dust-proof, heavy-duty cartons of 50 pounds, net weight. The Poly-Dispersions are said to be compatible with all commercial elastomers, specifically including butyl, Hypalon, natural, neoprene, nitrile and styrene-butadiene rubbers. As polyisobutylene is a non-vulcanizate, the binder portion of the Poly-Dispersion produces no effect whatsoever upon cures. Company officials stated that the nature of the binder produces excellent storage stability. Samples aged 18 months at temperatures ranging from 10 to 130°F. showed no change in activity rate and exhibited their original plasticity at room temperature. The Poly-Dispersions produce no detrimental physical properties and their active ingredient concentration means the introduction of an absolute minimum of extraneous material. Further information, suggestions and prices for Poly-Dispersion chemicals are available in a new bulletin published by the company.

Air Reduction Builds New Plant

► Air Reduction Chemical Co., New York, N. Y., has started construction of a new 20 million pound per year polyvinyl alcohol resin plant at Calvert City, Ky., and a supporting pilot plant at Bound Brook, N. J. Both projects will cost over $12,000,000 and are expected to be on stream by early 1960. The manufacturing process to be used by Airco was obtained under license from the Kurashiki Rayon Co., Ltd., Osaka, Japan. Polyvinyl alcohol is used in this country in the preparation of adhesives, textile sizing and finishes, paper coatings, and as emulsifying and thickening agents.

Doubles Acrylonitrile Capacity

► Union Carbide Chemicals Co., division of Union Carbide Corp., New York, N. Y., has doubled production capacity of acrylonitrile at the Institute, West Va., plant. Acrylonitrile is used in the manufacture of nitrile rubber, high-impact resins, acrylic fibers and new acrylonitrile derivatives. Two new derivatives, dimethylamino propylamine and diethylamino propylamine, are used in the manufacture of textile softeners.

Dr. Victor L. Erlich

Named Research Director

► Dr. Victor L. Erlich, formerly in charge of the development of polyolefin filaments, has been elected vice-president and director of basic research and development for Reeves Brothers, Inc., New York, N. Y. A chemical engineering graduate from the Institute of Technology, Vienna, Austria, Dr. Erlich joined Reeves in 1950 and later became director of research for the Plastics Division. One of his contributions for Reeves was the development of a polyethylene yarn that is stabilized against degradation from ultraviolet light.

Prior to joining Reeves, he was a chemical consultant in the United States and in his earlier career in Europe, Dr. Erlich was chief chemist and technical director of several chemical plants. Dr. Erlich has published several works comprising articles, papers and patents on polyolefin fibers, and on enzymatic reactions on protein and starch. He had done some earlier work on nitrogen compounds.

Moves Technical Laboratory

► Dyestuff and Chemical Division of General Aniline & Film Corp., New York, N. Y., has transferred the major section of its technical laboratory from New York City to the company's central research laboratory in Easton, Penna. The move was said to emphasize and consolidate the research program of the division. Company officials explained that the New York laboratory, which served both General Dyestuff and Antara Chemicals, will be integrated into an application research and technical service function of the Research Department. All of the laboratory's function, except the pigments and customer service and Export Sales office, will be transferred to the Easton Laboratory. The pigment laboratory will be moved to the company's Linden, N. J., plant, while customer service and the Export Sales office will be retained in New York.

New Goodyear Suburbanite

► Goodyear Tire & Rubber Co., Akron, Ohio, has introduced a new "Suburbanite" winter tire, which is said to have been redesigned from bead to bead and sells for less than predecessor lines. The tire has a deep-cleated tread which enables it to dig down through soft snow, slush or mud at a strong driving angle for better road footage, the company states. This is called "dynamic traction," which is the ability of the tire to grasp and pull even while the wheel is spinning, as compared with "break-away traction", which is the grip of a tire just before it spins. During two winters of testing near Hudson Bay, Canada, the tire is claimed to have given 51 per cent better traction in deep snow and up to 17 per cent better traction in mud. The new tread compounds combined with an inter-supported tread pattern also give a quieter, steadier ride on clean roads. The new Suburbanite contains 264 Grip-Cleats, 27 of which are involved in every footprint and the flat face of the cleats gives 30 square inches of tire contact on each footprint. Available in either triple-tempered 3-T nylon or rayon cord, the tire is pre-shaped for the road by a new manufacturing process.

MCA Publishes New Manual

► Manufacturing Chemists' Association, 1625 Eye St., N. W., Washington 6, D. C., has published a manual containing almost 300 newly recommended abbreviations for the reagent and fine chemicals field. The abbreviations are intended primarily for mechanical data processing systems in which text space is limited and not for more technical or scientific applications. A combination of phonetics, chemical symbols and common trade usage was employed to formulate the abbreviations. There is no official or semi-official requirement for use of the new abbreviations, but the MCA hopes that uniform standards will be established through general use of the new terms. "MCA Manual Sheet CA-1" is available at 20c a copy.

Named General Sales Manager

► Nopco Chemical Co., Newark, N. J., has appointed Robert J. Kingsley to the newly created position of general sales manager for the Pacific Division of the firm, with headquarters in Richmond, Calif. In his new position, Mr. Kingsley will be in charge of the expanded sales program and the administration and direction of sales efforts for all of the company's sales divisions in the eleven Western states. Mr. Kingsley will continue in the capacity of sales manager for the Fine Chemicals Division.

General Tire Names Two

► General Tire & Rubber Co., Akron, Ohio, has announced that P. J. Wallace has been appointed plant manager for the company's Odessa, Texas, synthetic rubber facility. Mr. Wallace, formerly superintendent at Odessa, succeeds James A. Pollack, who has been transferred to the company's Akron, Ohio, headquarters as a staff engineer in the Chemical Division. Dwight Jeffrey, formerly general foreman at General Tire's Mogadore, Ohio, chemical plant, has been named production superintendent at Odessa, succeeding Mr. Wallace.

Mr. Wallace has been with General Tire since 1943, when he joined the government-owned synthetic rubber plant at Baytown, Texas. In 1954, he was transferred to Ashtabula as production superintendent and was named plant manager there in 1956. Last April, he was assigned to Odessa as production superintendent. A native of Texas, Mr. Wallace is a graduate of the State Teachers College at Alpine, Texas. Mr. Jeffrey is a native of Toronto, Ohio, and was educated at Ohio State University, from which he received a chemical engineering degree. Immediately after graduating from Ohio State, he joined General Tire's Chemical Division. He was named general foreman at the division's Mogadore, Ohio, plant in 1954. He is a member of the American Institute of Chemical Engineers.

Form New Chemical Company

► Cumberland Chemical Corp., a new company, has been formed by Air Reduction Co., Inc., and Mastic Tile Corp. of America, makers of floor tile. According to a joint announcement, Cumberland will erect a $10 million plant at Calvert City, Ky., for the production of vinyl chloride monomer, vinyl chloride polymer and a new type of plasticizer. Acetylene, one of the raw materials, will be supplied by Airco. A 60 per cent stock interest in the new firm is held by Air Reduction, while Mastic Tile holds 40 per cent interest. John A. Hill, president of Air Reduction, will serve as chairman of the company, Seymour Milstein, president of Mastic Tile, as vice-chairman, and C. J. McFarlin, president of Air Reduction Chemical Co., as president. Other directors include J. D. Gunther, a vice-president of Airco, and R. B. Schneider, a vice-president of the Empire Trust Co.

Named Vice-President

► B. F. Goodrich Industrial Products Co., Division of the B. F. Goodrich Co., Akron, Ohio, has elected James C. Richards, Jr., vice-president for sales, effective October 1. Mr. Richards was formerly vice-president for sales at the B. F. Goodrich Chemical Co.

Carbide Names Group Leaders

► Dr. Frank E. Critchfield and Lloyd H. Wartman have been appointed group leaders in the Development Department of Union Carbide Chemicals Co., Division of Union Carbide Corp., at South Charleston, West Va. At the same time R. E. Freyer and A. M. Gross have been transferred from Bakelite Co. to the Development Department of Union Carbide Chemicals as chemical engineers. Dr. Critchfield, who was promoted from chemist to group leader, will be in charge of development work on chemical methods of analysis. Before joining Carbide in 1953, he attended West Virginia University and received B.S., M.S. and Ph.D. degrees in chemistry. Mr. Wartman was transferred from the Development Department of Bakelite to his new position where he will be in charge of product development work on polyolefins. He joined Carbide in 1947 after graduating from the College of St. Thomas with a B.S. in chemistry and from Polytechnic Institute of Brooklyn with an M.S. in chemistry.

Reopening Tread Rubber Plant

► U. S. Rubber Co., 1230 Avenue of the Americas, New York, N. Y., announced that it will reopen its plant in Milan, Tenn., on December 1, 1958, to make tread rubber for the South's fast-growing tire retreading industry. Initially, the Milan plant will turn out tread rubber at the rate of 8 million pounds a year. Future production schedules will be geared to meet the needs of tire retreaders in the south, South Central and Southwestern states, the area that will be served by the plant.

Borden Announces Polyco XP 24-97

► A new copolymer of butadiene and styrene named "Polyco XP 24-97", specially made for use in baking finishes on metal surfaces, has been announced by the Polyco-Monomer Department of Borden Chemical Co., New York, N. Y. In the copolymerization of butadiene with styrene, the resulting copolymer still retains one double bond per unit, thus retaining a substantial degree of unsaturation. By means of metallic catalysts and elevated temperatures, cross-linking is produced and the polymer is converted from a soft, slightly tacky, solvent-susceptible material to a dry, tough, solvent resistant film. The new product lends itself readily to the formulation of metal primers and gloss finish coats, both for dip and spray applications. Applied to metal, the latex Polyco XP 24-97, forms a film by the customary mechanism of fusion of the resin particles. But on baking at elevated temperatures it converts to a hard, tough, water and alkali resistant film with excellent adhesion to most substrates.

Named Scovill President

► Scovill Manufacturing Co., Waterbury, Conn., has announced that Selden T. Williams has been elected president and general manager succeeding William M. Goss, who has retired. The company also announced the retirement of Leavenworth P. Sperry as chairman. Mr. Williams has been president of the A. Schrader's Son Division of Scovill, Brooklyn, N. Y., since 1950. He joined Schrader's, a producer of pneumatic valves, in 1929, was elected a vice-president of Scovill in 1944 and a director in 1956.

► Posing for the official photograph here, are the committee members for the 13th Annual Outing of the Connecticut Rubber Group which was held on September 6 at Grassy Hill Park in Derby, Conn. Some 156 members and their guests enjoyed a day full of good food, good fun and many prizes. In the first row, from left to right, can be seen H. Gordon, T. Zimmerman, G. Sprague, G. Jerolman, C. Haynes and W. Perkins. The second row occupants, in the same order, are D. Cummings, W. Carter, V. Chadwick, W. Couch, R. Dudley, R. Ward, O. Lang and C. Larson.

AICE Annual Meeting Planned

► The 51st Annual Meeting of the American Institute of Chemical Engineers, to be held at the Netherlands Plaza Hotel in Cincinnati, Ohio, on December 7 to 10, has scheduled fifteen technical sessions at which about 100 papers will be presented. The names of officers for 1959 will be announced and the meeting will also feature the presentation of three awards, including the William H. Walker Award, the Junior Award and the Professional Progress in Chemical Engineering Award, to outstanding leaders in the profession.

Technical sessions will include Pollution Control by In-Plant Measures: A. I. Ch. E. Research on Bubble Cap Tray Efficiency; High Speed and Time Lapse Photography, Kinetics and Rate Processes; Computers Applied to Heat and Mass Transfer; Spray Mechanism; Guide-Post in Long Range Planning, Reprocessing of Fluid Reactor Fuels; Processing Irradiated Fuels, Air-Cooled Heat Exchange; Low Temperature Processing; Scale-Up from Pilot Plant to Plant; Developments in Synthetic Rubber; Education in Process Control.

New Houdry Unit On Stream

► A new Houdry dehydrogenation process unit with an annual capacity of 36,000 metric tons of butadiene has gone on stream at the Chemische Werke Huels, A.G., Marl, West Germany. Designed by Houdry Process Corp., Philadelphia, Penna., the new unit produces butadiene from refinery butanes and butane-butene mixtures from petroleum refineries. The West German unit is the first of three Houdry licensed foreign dehydrogenation plants to go on stream. Others are under construction in Japan and Italy. Seven Houdry dehydrogenation units are on stream in the United States. The process can be operated to produce butadiene for synthetic rubber, fiber, paint and textiles; butenes for alkylation to very high octane motor fuel, or adapted to produce olefins from corresponding light hydrocarbon feedstocks.

Atlas Offers New Polyether

► Atlas Powder Co., Wilmington, Del., has developed a new low-cost polyether that is expected to replace the more costly polyesters in rigid polyurethane foam manufacture. This polyether is a derivative of sorbitol, and has six hydroxyl groups available for cross-linking. Since rigid polyurethane foams can use up to 60 per cent by weight of the new polyether, manufacturing costs can be reduced. Rigid foamed-plastic materials are becoming increasingly important as strong fillers in the new sandwich-type construction used in domestic and commercial refrigerators and freezers, refrigerated cars and trucks, boats, building panels and elsewhere.

Goodyear Promotes Earhart

► Goodyear Tire and Rubber Co., Akron, Ohio, has announced that R. S. Earhart, formerly assistant general sales manager of the domestic Chemical Division, has been appointed manager of the company's International Corp. Chemical Division. Mr. Earhart, acting manager of the international group since June, 1957, succeeds R. E. Workman, who was recently appointed assistant general manager of the Chemical Division.

Mr. Earhart joined the company in 1940 in the Budget Sales Department of the Dayton, Ohio, store and later, was transferred to Huntington, West Va., as budget manager of the company store there. Following five years of military service, he rejoined Goodyear in 1945 and was assigned to the Chemical Division in Akron. Mr. Earhart became operating manager of the division in 1947, operating and marketing manager in 1953, and assistant general sales manager in 1955. He is a graduate of Ohio Wesleyan University and is a member of the American Chemical Society, the Akron Rubber Group and the Society of Plastics Engineers.

Rubber Improves Paving Mix

► Rubarite, developed by the Goodyear Tire and Rubber Co., Akron, Ohio, for paving applications, is said to enable construction of a smoother, longer lasting road surface, requiring less maintenance than has been obtained with previous paving materials. Approximately 1,300 tons asphaltic hot mix, including six and a half tons of Rubarite, were recently used to pave Akron's North Hill Viaduct. Content of Rubarite in the mix was three per cent of the weight of the asphalt.

The mix, designed for maximum flexibility and stability, is said to give a longer lasting road surface, more uniform texture and more flexibility at low temperatures. Such mixes also have high adhesive strength, are stronger and retain their elasticity, the company states. Ability to withstand rapidly fluctuating weather conditions, longer wear, greater resistance to stripping, oxidation and bleeding, and reduced maintenance costs are the chief advantages of the use of Rubarite in asphalt mixes, according to Goodyear engineers.

Receives Ripple Sole Award

► A special award has been presented to Harvey B. Evans, president of L. B. Evans' Sons Co., Inc., Wakefield, Mass., for the firm's "valuable contribution toward the success of the Ripple Sole." Presentation was made by Nathan Hack, inventor of the Ripple Sole, before a gathering of more than 175 representatives of leading shoe firms, including manufacturers, retailers and stylists at the Palmer House in Chicago, Ill. As far as can be determined, the company states, this is the first time a shoe manufacturer has been so honored.

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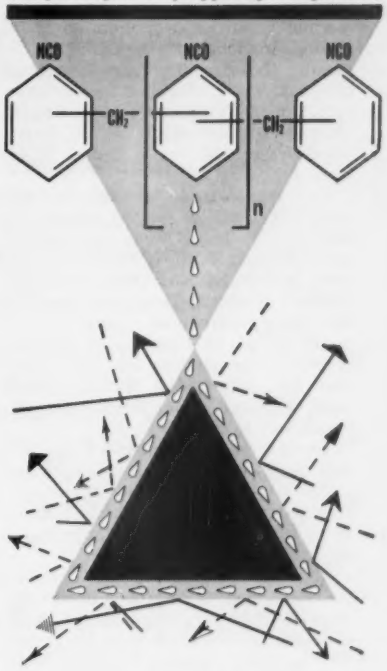

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Akron Holds Fall Meeting

► Approximately 750 members and guests of the Akron Rubber Group attended the technical portion of the Fall Meeting held on October 24 at the Sheraton Hotel, Akron, Ohio. The meeting featured a symposium on "Tire Testing Methods" moderated by R. J. Brown (Goodyear). Panel members included W. F. Perkins (Goodrich); F. S. Conant (Firestone); A. H. Easton (Wisconsin University); J. W. Drew (Goodyear), and F. C. Leone (Case Institute).

The non-technical portion of the meeting featured a banquet which was addressed by Jesse Owens, track champion. William Ford (Columbian Carbon) introduced Mr. Owens. George Hackim (General Tire), chairman of the group, introduced members and guests seated on the dais. It was reported at the meeting that the group now has 1,319 paid members. The Audit Committee announced that the books were in order.

The Akron Group sponsors two lecture series, basic and advanced, at the University of Akron, and offers four scholarships. Two recent recipients of these scholarships were in attendance at the meeting.

In other activities at the banquet, Sheldon Nicol (Goodyear) past-chairman of the group, was presented with a plaque for his services to the organization. The treasurer's report indicated that the group now has $8,019 in the treasury.

A number of by-law changes were suggested at the meeting. These will be voted on by mail. A complete report of the panel discussion and of the by-law changes will be presented in the December issue of this journal.

Avisco Selling Virginia Unit

► American Viscose Corp., New York, N. Y., announced recently that it planned to end rayon textile yarn manufacturing operations at the Roanoke, Va., plant and was undertaking to sell the entire facility. The company said that it would discontinue the Roanoke operations as soon as it was "practical." This would mean consolidating productive capacity of continuous filament rayon textile yarns in two other plants, the company said. However, the Roanoke plant was still "actively engaged" in the manufacture of Filatex elastic yarns, though negotiations for the sale of facilities to produce these yarns were also going on, Avisco said. The company planned to sell the Filatex plant separately from the textile yarn facilities and to get "completely out" of the elastic yarn business, a spokesman said. It was hoped that these facilities might be sold without disrupting the supply of yarns to customers.

U. S. Rubber Stockholders

► U. S. Rubber Co. has announced that its common stock ownership has broadened rapidly in the past year and as of July 31, the company had 29,072 common shareholders, 10 per cent more than the 26,392 on record last year. Common shareholders were increased by more than 2,000, or 7½ per cent in the first seven months of 1958. In recent weeks, new shareholders have been put on the company books at the rate of about 300 a week. Preferred shareholders numbered 8,499 on July 31, bringing to 37,571 the combined total of common and preferred shareholders.

Ace Elects New President

► Charles J. Snyder, formerly executive vice-president, has been elected president of Ace Rubber Products, Inc., Akron, Ohio, succeeding his father, Floyd C. Snyder, who has been elected to the new post of board chairman. Charles Snyder is a native of Massillon, Ohio, and attended Michigan State University. He served for several years as an engineer at Lockheed Aircraft before he joined Ace. Along with his presidential post, Mr. Snyder will continue to serve as general manager. Floyd Snyder had served as president of the company since it was founded in 1936 and previous to that, he was president of the American Rubber & Tire Co., Ace's predecessor. Ace directors also elected C. N. Jenkins as vice-president in charge of sales and Robert N. Turgeon as secretary-treasurer. Mr. Turgeon is also a director.

Firestone Introduces Diene

► Firestone Tire & Rubber Co., Akron, Ohio, has developed a new synthetic rubber called "Diene", as its latest addition to a long list of synthetic products. Company officials said that tests of truck tires made with a substantial portion of Diene, revealed improved crack-resistance, satisfactory tire running temperature, and improved skid resistance due to the pliability of Diene at low temperatures. The basic ingredient used in making Diene is butadiene, along with derivatives of lithium which are used as catalytic agents. The company said that "Coral" rubber—essentially the synthetic equivalent of natural rubber—and Diene may play an important role in the conservation of natural rubber by reducing the amount of the tree-grown product necessary in the stockpile for national emergencies.

Plans To Acquire Okonite

► Kennecott Copper Corp., New York, N. Y., has announced plans to acquire the Okonite Co. through an exchange of stock. Spokesmen for both companies said a contract has been signed under which Kennecott would acquire, through a new subsidiary company, the properties, assets, business and good will of Okonite in exchange for Kennecott common stock on a share-for-share basis. The proposal is to be submitted to Okonite shareholders at a special meeting scheduled for November 24. If approved, the proposal will take effect immediately. Under the plan, the present Okonite Co. would be dissolved and a new company with the same name would be formed to operate as a Kennecott subsidiary. If the merger is effected, Kennecott plans to continue the fundamental policies of Okonite and to take over employment contracts of Okonite's principal officers "to assure continuance of their services." The present Okonite operating management includes A. F. Metz, chairman; R. Stuart Keefer, president; C. M. Kirkland, vice-president, marketing; D. W. Nurse, vice-president, manufacturing, and R. P. Lapsley, vice-president, research.

Plans Sale of Beacon Unit

► New York Rubber Corp. has announced plans to sell its plant at Beacon, N. Y., which has been closed since July 26 because of a strike by the Rubber Workers Union. A statement issued by the board of directors said that a continued loss of income because of the strike "would mean a gradual dissipation of the company's resources and a slow strangulation and eventual death for the company." The directors' statement said there appeared to be no hope of reaching a settlement of the strike and that the company would operate elsewhere. Negotiations on a new contract broke off on October 7 and the company announced it was permanently closing the Beacon plant on October 9.

Named Director of Research

► Dr. Clarence Bremer, formerly director of research, has been appointed technical director of Oakite Products, Inc., New York, N. Y., in which position he will be responsible for the company's research and product development and technical service laboratories. A member of Oakite's board of directors since 1956, Dr. Bremer has been with the company since 1942. He is a member of the American Chemical Society, the American Ordnance Association, the American Society for Metals, the National Association of Corrosion Engineers, Institute of Chemists, and Sigma Xi, the national scientific honorary society.

Huntoon Named Deputy Director

► Dr. Robert D. Huntoon has been appointed to the newly created position of deputy director of the National Bureau of Standards, Department of Commerce. In this post, Dr. Huntoon will serve as alternate to the director in external matters, and will exercise day-to-day direction and review of Bureau programs, working through the Associate Directors for Engineering, Chemistry, the Boulder (Colorado) Laboratories, Planning, and Administration. He will continue to serve as Associate Director for Physics.

Dr. Huntoon joined the Bureau staff in 1941, as one of the principal scientists concerned with the development of the radio proximity fuse. Since then he has been, at various times, chief of the Electronics Division, chief of the Atomic and Radiation Physics Division, acting chief of the Central Radio Propagation Laboratory, coordinator of Atomic Energy Commission projects at the bureau, and director of the Bureau's Corona (Calif.) Laboratories.

He received his B.A. degree in Physics from Iowa State Teachers College in 1932, and earned his M.A. and Ph.D. from the State University of Iowa in 1935 and 1938 respectively. Prior to coming to the bureau, he was an instructor of Physics at New York University, and a research physicist with the Vacuum Tube Division of Sylvania Electric Products, Inc.

Offers Tire-Rim License

► Firestone Tire & Rubber Co., Akron, Ohio, has granted royalty-free licenses to the companies in the tire and rim manufacturing business for the manufacture of a new standard tubeless truck tire and one-piece drop-center rim. Firestone was issued a patent for the development in 1957. In addition to the royalty-free license, the company is offering production "know-how" which it acquired in the development of the new tubeless truck tire. The new product features a 15° bead taper and a shortened bead and sidewall structure. These features are said to enable substantial savings in costs in tire production and operation. The use of a one-piece, drop-center rim affords a lighter, unsprung wheel weight, avoiding road shocks and reducing rapid deterioration of wheels and axles.

Goodyear Appoints Link

► Goodyear Tire & Rubber Co., Akron, Ohio, has appointed Malcolm D. Link as superintendent of the company's textile mill at Rockmart, Ga., succeeding P. W. Beggs, who has retired after 38 years' service. Mr. Link, who has served as assistant superintendent of the Rockmart mill since 1945, joined the organization in 1929 as night superintendent at the company's textile mill near Carterville, Ga.

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Named Para-Chem Agent

► Para-Chem, Inc., Philadelphia, Penna., has appointed Ralph Gossett & Co. as southern representative for the sale and distribution of Para-Chem products throughout the southern territory. Gossett is well known in the south as a manufacturers' representative which offers a complete service of textile supplies, textile machinery and yarn. The addition of the Para-Chem line of latex compounds, sold under the trade name "Paranol" marks the first entry of the company into the wet processing field. Assisting Gossett sales representatives as technical adviser will be James E. Kerr, of Para-Chem. Mr. Kerr has been active for the past ten years in the latex compounding business and is well versed in all types of latex applications.

Para-Chem has also announced the appointment of Frank A. Mather as a technical representative for the sale and application of latex compounds in the textile, paper and adhesive fields. Mr. Mather was formerly a special representative for the Chemical Division of the Goodyear Tire & Rubber Co., and has had broad experience in the sale and service of latices, resins and chemicals. He is a member of the American Association of Textile Chemists and Colorists, the American Chemical Society, the Philadelphia Rubber Group and the Technical Association of the Pulp and Paper Industry.

Textile Division Expands

► Textile Division of the U. S. Rubber Co., New York, N. Y., has formed an Industrial Textiles Department by merging the Asbeston Sales and the Industrial Yarns and Fabrics Departments in a program to expand and diversify its operations in the industrial textiles business. The division also plans to expand production facilities at three of its 11 plants, including those at Hogansville, Ga.; Shelbyville, Tenn., and Winnsboro, S. C. Frederick T. Hopkins, formerly manager of industrial yarns and fabrics, has been appointed sales manager of the new Industrial Textiles Department, while Herbert E. Sunbury, formerly manager of Asbeston sales, has been appointed sales development manager of industrial textiles. B. D. Hubbard and F. C. Hoplins have been named supervisors for new product development and technical service.

Another part of the expansion program is the assignment of eight sales representatives to new company territories throughout the United States. Included are John Fowler, Midwest; W. H. Bric and Stewart Smith, West Coast; Don Nichols, Southeastern states; Hugh Savage, New England; Staton Peele and Walter Hitchcock, metropolitan New York, New Jersey, Pennsylvania, Delaware and Maryland, and J. W. Reid, central Pennsylvania.

Bankers Band Bargain

► Extra lightweight but strong rubber bands that come 2,500 more to a pound than bands normally used, have been developed especially for handling bankers' monthly statements by the B. F. Goodrich Industrial Products Co., Akron, Ohio. The new band stretches as far as the old one but has a touch that is more sensitive and does not curl checks banded together. Band width has been reduced to one thirty-second of an inch and they cost less to use than a metal paper clip. Development of a special band for bankers' use should be worthwhile since many banks use tons of bands annually. One banking institution in New York regularly buys three tons of bands a year on a bid basis. Translated into terms of the new rubber band, this means 33 million rubber bands snapped around checks and assorted papers.

Diamond Plans Research Center

► Diamond Alkali Co., Cleveland, Ohio, plans to build a multi-million dollar, campus-style research center a few miles south of Painesville, Ohio, as part of a long-range research and development expansion program. Expected to enable the company to meet anticipated growth needs and to maintain its competitive position in the chemical industry, the new facility will supplement the company's present scientific facilities in Fairport, and will be located on an 800-acre tract in Concord Township, Ohio.

The center will be constructed in stages, its initial phase comprising a multi-unit group of buildings for central research and development. The first two units planned are the Central Research Building and the Development Building. The former, 90 by 280 feet, will be a completely air-conditioned, two-story structure with full basement. It will provide space for 60 laboratories, 22 offices, library, Patent Department and other supporting services. The Development Building, 100 by 109 feet, will house a pilot area providing an open section for experimental operations. Balconies will be constructed at the second and third floor levels around the perimeter of the building. The second phase of the project will be an extension of the first units along with additional buildings to meet expanded research requirements.

► Claremont Pigment Dispersion Corp. has formulated electronically heat sealable vinyl gravure inks in the "VC" series which are said to permit rapid and complete release of solvents.

Atomic Plane Tires Tested

► Future atomic-powered aircraft can use tires made of either natural rubber or synthetic materials, according to conclusions reached by research scientists at Goodyear Tire & Rubber Co., Akron, Ohio. Their findings are based on more than two years of tests during which they have been exposing airplane tires to nuclear radiation. During these experiments at Goodyear's cobalt 60 radiation laboratory and the Oak Ridge atomic plant, the tires were subjected to gamma rays and neutrons without detrimental effect. Charles F. Bush, chief engineer for aircraft tire development, said, "We found that by using nitrogen, an inert gas, in lieu of air for inflation, beneficial results could be obtained." As the nitrogen diffused normally through the tire, a protective cloak surrounded the cords preventing their degeneration. Materials tested included natural rubber, nylon, rayon, Dacron and various other elastomers and cord fabrics. Based on these tests, Goodyear believes development of tires for atomic-powered craft will be accomplished without difficulty as far as the detrimental effects from radiation are concerned.

Nylon Steel Guard Tire

► Goodyear Tire & Rubber Co., Akron, Ohio, has introduced a new nylon truck tire with steel cord breaker strips, designed for use in mining, logging, construction, industrial sites, and other areas where sharp puncturing objects are a hazard. Called the "Nylon Steel Guard," the tire has two criss-crossed steel cord breaker strips built in beneath the tread to protect an area considered to be most vulnerable to punctures. The protective steel shield combined with triple-tempered 3-T nylon cords is said to give truck owners a low cost-per-mile tire for rugged use. The tire is available in Road Lug tread design in sizes 8.25-20 through 12.00-24. Three sizes of Hard Rock Steel Guard Nylon tires, 11.00-22, Lug 14; 12.00-24, Lug 16, and 12.00-24, Rib 16, are also available.

Paralese Mold Release

► Para Products, Washington, D. C., has developed a new silicone spray mold release and lubricant which is formulated with a very high silicone-to-freon ratio. Called "Paralese", this product is said to give more silicone per shot, affording quality coverage and elimination of sticky and marking molds. Particularly applicable in the plastics field, the new product is also employed in the rubber, shell molding, die casting, electronics and epoxy fields. A companion product, "Paralese Zinc Stearate Dry Powder Spray", has been formulated for use on polyethylene and molded parts.

Emery Appoints Four

► Robert S. Haley has been appointed to the New York office of the Organic Chemical Sales Department staff of Emery Industries, Inc., Cincinnati, Ohio. At the same time, the firm announced that J. Warren Sackett has been assigned to the Cleveland, Ohio, office and that Walter R. Paris has been assigned to the Lowell, Mass., office. Robert H. Endres has been assigned to a newly-created territory with headquarters in Pittsburgh, Penna. Mr. Haley transfers to the Organic Chemical Sales Department from the Vopcolene Division, for which he served as Eastern sales representative prior to its acquisition by Emery earlier this year. In his new position he will handle all non-textile chemicals in the company's Organic Chemical line.

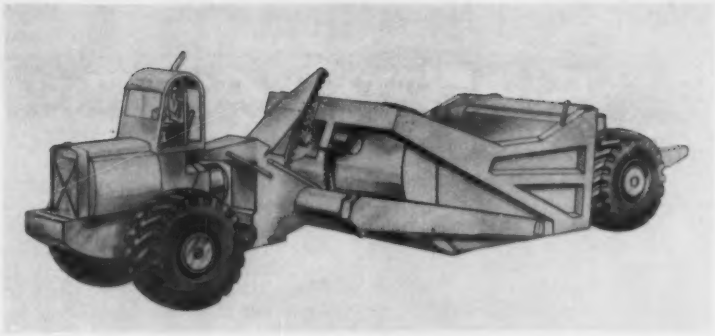
Mr. Sackett, who was general manager of Bay Rubber & Plastics, Inc., will handle Emery's entire Organic Chemical line in eastern Michigan and the state of Ohio. A graduate of Ohio State University, Mr. Sackett is a member of the American Chemical Society, the Society of Plastics Engineers, and the Akron Rubber Group. Mr. Paris comes to Emery from Godfrey L. Cabot, Inc., where he was New England sales representative. He will sell non-textile chemicals in all of New England and upper New York state. He is a graduate of Harvard University and a member of the Boston Rubber Group, the Rhode Island Rubber Group, and the Society of Plastics Engineers.

Mr. Endres, who formerly was associated with Standard Oil of Indiana, will take charge of the territory including western New York, Pennsylvania, West Virginia and southeastern Ohio. Mr. Endres is a chemical engineering graduate of the University of Colorado and is a member of the American Chemical Society and the American Institute of Chemical Engineers.

Adds New Sizes to Tire Line

► B. F. Goodrich Co., Akron, Ohio, is now marketing four new sizes of ribbed tread tires for use on boat and utility trailers. These tires have extra-wide level treads for long wear, and smooth ribs with deep grooves for less sway on curves. There are now six sizes available in the ribbed tread design. The new sizes are 4.80-8, 6-ply; 4.80/4.00-12, 4-ply; 5.70/5.00-8, 4-ply, and 5.70/5.00-8, 6-ply. This line is also available in sizes 4.80/4.00-8, 4-ply and 5.30/4.50-12, 6-ply.

► Ball & Jewell, Inc., Brooklyn, N. Y., has issued a brochure describing how its new "Heater-Dryer" can be used as an attachment to injection molding and extruding machines.



LeTourneau Earthmoving Scrapers

► R. G. LeTourneau, Inc., Longview, Texas, introduced what are said to be the largest self-propelled earthmoving scrapers at the American Mining Congress, held in San Francisco, Calif. on September 22 to 25. The company demonstrated a new 70-ton unit in the first showing of any earthmoving machinery by LeTourneau since the sell-out of its previous line in 1953. The new self-propelled scrapers are said to be the latest step in the development of this type of machine, which was originally pioneered by the company in 1938. Major difference between the powerful, supersized scraper and conventional scrapers is that each wheel of the new machine has an individual electric motor geared directly to its inner rim, which is designed to provide greater traction and working power under the payload than has ever before been attainable. Power is supplied by the machine's 500-hp diesel-electric dynamo. The first units will be in the 70 and 125-ton class, roughly equivalent to 50 and 100-cubic yard capacity. Conventional scrapers average 15-cubic yard capacity with a few going 35 yards, LeTourneau states.

Jefferson Appoints Three

► Jefferson Chemical Co., Inc., Houston, Texas, has announced the appointment of three new sales representatives. Two of the representatives, Robert E. Lee and Patrick W. Loftus, will report to the company's Chicago office, while the third, Ellsworth F. Benson, will report to the New York office. Mr. Lee attended the University of Houston where he received a B.A. degree in sales psychology in 1953, followed by two years postgraduate work in chemistry. He was formerly employed by the Upjohn Co. Mr. Loftus, formerly with the Dow Chemical Co., received a B.S. degree in chemical engineering in 1957 from the Illinois Institute of Technology. Mr. Benson was graduated from the University of Nebraska in 1956 with a B.S. degree in economics and a minor in chemistry. He was formerly with Dow Chemical.

Kaiser Names Managers

► The Electrical Conductor Division, Kaiser Aluminum & Chemical Corp., has named Gillette N. Houck manager of promotion and technical development and J. Carl Ferguson, general sales manager. The division's field engineering, marketing and administrative departments have been moved from Chicago to the plant at Newark, Ohio.

Chemicals Combat Rubber Odor

► A fragrance life of two to five years can be imparted to rubber formulations with the aid of a newly-patented odor-retentive compound developed by the Tyrex Drug & Chemical Corp., New York, N. Y. Described as saponified derivatives of natural essential perfume oils, the new compounds have the unique feature of combining a relatively low initial emission of the fragrance and an extraordinarily long fragrance life. Used in rubber compounds, the new compounds serve to mask any odor arising from the rubber itself, and at the same time emit a lastingly pleasant aroma. The compounds, which are crystalline in structure and very light in color, are compatible with all materials used in rubber compounding. Company officials said that their technical staff will work closely with rubber chemists in adapting the new materials to specific formulations.

B. B. Chemical Elects President

► Roger T. Perkins has been elected president of the B. B. Chemical Co., Cambridge, Mass., succeeding Russell K. Nash, who has retired as chief executive of the company. Mr. Perkins became associated with the firm in 1929 and was appointed general manager in 1952.

West Coast News

► The technical session of the November 4th meeting of the Los Angeles Rubber Group was to have been addressed by Dr. E. G. Partridge, director of the TLARGI Rubber Technology Foundation on the subject "Latex Technology." In an abstract of his paper, Dr. Partridge states that the largest and most familiar part of the rubber industry manufactures articles directly from rubber in the liquid state as it comes from the tree, or polymer plant. There are advantages in this method over conventional production methods from solid rubber and as a result, the proportion or rubber used as latex has been increasing in the United States.

At present, 13 per cent of natural rubber and about 7 per cent of synthetic rubber is used in this form with the largest single use being in foam products. Dr. Partridge described some of the methods used in the compounding of latex and the manufacture of products from its compounds, and also planned to show samples of these products and demonstrate some manufacturing processes.

Tlargi has announced prize winners at the final Golf Outing, which was held on October 17. They are: *First low net,* C. M. Churchill (Naugatuck Chemical); *First low gross,* Art Butler (Guest); *Second low net,* J. W. Arensmeyer (Ratliff Rubber); *Second low-gross,* J. P. Ballesio (Firestone); *Longest putt,* A. P. Paulk (Naugatuck); *Closest to the pin,* D. P. O'Connell (Shell Chemical); *Blind Bogey* (Tie), Dean Kring (Guest) and J. G. Nolan (Thiokol); *Consolation prize,* F. D. Starritt (Extruders).

Prize winners at Tlargi's October meeting included: *Door prize,* Bob Schneider (Maclin); John Todorov (Aero-Jet General); H. J. Brandenburg (Firestone); Fred Owen (Gross Mfg.); Ray Slager (Shell); Don Montgomery (Xylos Rubber) and Gordon McMahon (Reeves).

The group has scheduled its Christmas party for Friday, December 12 at the Grand Ballroom of the Beverly Hilton Hotel. Dinner will be served and top entertainment provided.

► American Latex Corp., Hawthorne, Calif., has announced four new appointments including that of Major General Gerald J. Higgins as assistant to the president on military matters for both American Latex and the Dayton Rubber Co., Dayton, Ohio. The company has also appointed Del Holter as contracts administrator, John N. Kempf as adhesive chemist and Glenn A. Wintemute as manager of Pacific Polymers, Inc.

Gen. Higgins was graduated from West Point Academy in 1934 and ten years later, became the youngest commissioned officer to receive a battlefield promotion to brigadier general. He held the rank of major general when he retired in 1955, after commanding the 82nd Airborne Division at Fort Bragg, N. C. He holds the Silver Star, Legion of Merit and Bronze Star Medals, along with several decorations from allied governments during World War II.

Del Holter, who has served American Latex as cost estimator for three and a half years, will head the newly formed department devoted to Federal and State contracts. A graduate of Woodbury College, Mr. Holter attended special engineering courses at U.C.L.A. Mr. Kempf is a professional plastics engineer with degrees from the Canadian Institute of Science & Technology. In his new post, he will study the potential applications of Stabond sealants and adhesives. As manager of Pacific Polymers, researchers and developers of plastic and latex compounds and chemical intermediates, Mr. Wintemute "will continue to provide improved service and products commensurate with increasing industrial requirements."

► Russ Spachman, who was formerly in the Order Department of the Los Angeles Standard Rubber Co., has been appointed purchasing agent.

► Commercial Rubber Co. has announced the completion of an additional 10,000 square feet of plant area for storage of finished products and raw materials.

► Ken Champagne is now associated with Western Insulated Wire Co. as a chemist.

Buys Perma Stamp

► S. C. Johnson & Son, Inc., Racine, Wisc., has announced the purchase of the Perma Stamp Corp., Los Angeles, Calif. Through this purchase, Johnson receives patent rights on "Porelon", a new synthetic material in which liquid can be incorporated during manufacture, then given off at a predetermined rate. According to Johnson, application possibilities include a non-rubber printing stamp, bandages with built-in medicaments, cigarette filters, self-lubricating bearings, dry batteries and waterproof sheeting. The company is presently investigating this material's possibilities for its own product lines and is also offering to license other manufacturers who might develop new products through the use of Porelon.

Glenn D. Jackson, III

Named To New Post

► Dewey and Almy Chemical Division of W. R. Grace & Co., Cambridge, Mass., has appointed Glenn D. Jackson, III, sales representative for organic chemicals in South Carolina, Georgia and Florida. Mr. Jackson will represent the company's vinyl acetate polymer and copolymer emulsions; styrene butadiene latices and resins; plasticizers and dispersing agents—organic chemicals used in the paint, paper, adhesive, textile and plastic industries. With Dewey and Almy for a year as assistant to the sales manager, Mr. Jackson received a B. S. in business administration and chemical engineering from the Massachusetts Institute of Technology in 1955.

Witco Polyester Resins

► Commercial availability of a full line of high-quality, uniform polyesters for the production of either rigid or flexible urethane foams has been announced by Witco Chemical Co., Inc., New York, N. Y. Meeting the growing demand for rigid products, Witco is offering "Fomrez R-400 and P-420," a foaming system containing prepolymer and polyester. This system can be foamed in place by batch, continuous or intermittent machine mixing or used in spray applications. Fomrez 50, 70 and D25-30 are new polyesters for flexible foams. These are widely adaptable to commercial processing equipment and can be used to provide a foam of varying densities and other physical properties.

Minnesota Mining Calls Stock

► Minnesota Mining and Manufacturing Co., Minneapolis, Minn., has announced a call for redemption on December 12 of the 70,000 outstanding shares of its $4 cumulative preferred stock at $103 a share. The shares to be retired are part of 100,000 issued in 1947.

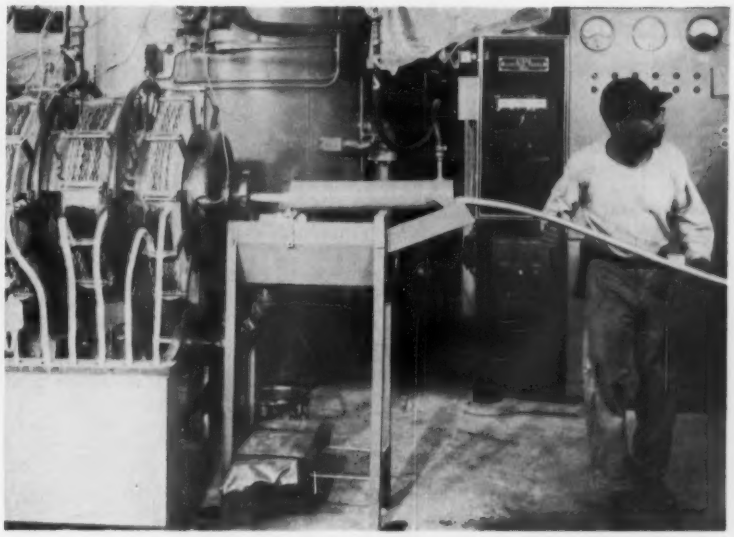
International Personnel Shifts

► Goodyear International Corp., a subsidiary of the Goodyear Tire and Rubber Co., Akron, Ohio, has announced six organizational changes including the appointment of H. A. Brundage as financial director and secretary, Goodyear-India; William L. Bruce as technical superintendent, Goodyear-South Africa; James E. Sharpless as sales manager, Goodyear-Australia; T. C. Wallace as sales manager, Goodyear-Argentina; Jack E. Carter as sales manager, Goodyear-Colombia; and Gerald F. Keirn as chief engineer, Goodyear-Venezuela.

Mr. Brundage, associated with the company since 1941, has served as secretary-treasurer of Goodyear-Luxembourg and Goodyear-Sweden. He has been on special assignment in Akron since last November. Mr. Bruce joined Goodyear in 1942 and has been chief chemist at Goodyear-Sweden since 1952. Mr. Sharpless, who was formerly assistant manager of the Western Hemisphere Division, has served with the company since 1944. Mr. Wallace has been with Goodyear as manager of aviation products at the Wolverhampton, England, facility since 1954 and previous to that held a similar position in Akron. Mr. Carter was previously assistant sales manager in Colombia, and prior to that served Goodyear in Guatamala. Mr. Keirn, associated with the company since 1940, has served as an electrical engineer in Colombia and South Africa and returned to Akron last January.

Mobay Chemical Names Three

► Dean Tyler has been named to the newly created post of manager of foam chemical sales in the general sales office of Mobay Chemical Co., Pittsburgh, Penna. Succeeding Mr. Tyler as manager of the Eastern Sales District in New York City will be Donald H. Bryan, who was formerly sales representative in Los Angeles, Calif., for the West Coast Area. Harold D. Ulmer has been appointed to fill the West Coast position. Mr. Tyler, who has been with the firm since 1954, previously worked in both research and production for Monsanto Chemical Co. He holds an engineering degree from Yale University and is a member of the American Institute of Chemical Engineers. Before joining Mobay in 1955 as the West Coast sales representative, Mr. Bryan was in the technical service department of Monsanto. He holds a B.S. from Oklahoma A & M and is a member of the Society of Plastics Engineers. Mr. Ulmer was formerly in the technical service group of Mobay and before that he was associated with Monsanto. He is a graduate of the University of Cincinnati and a member of the American Chemical Society.



Installs Continuous Lead Extruder

► With the recent installation of a continuous lead extruder in its Philadelphia, Penna., plant, Quaker Rubber Division of the H. K. Porter Co., Inc., is said to be the first rubber manufacturer in the East capable of producing continuous lengths of molded hose with uniform size and quality. Quaker Pioneer Works, Pittsburg, Calif., has been using this process successfully for a number of years. Uniformity in size and quality of molded hose was virtually unattainable with the stroke type or reciprocating method formerly used, the company states. The lead sheath produced by the stroke type press introduced objectionable lead marks on the hose when the stroke or lead billet was changed. In many cases these marks had to be cut out resulting in several short lengths instead of the more desirable one piece reel. This method also caused a considerable degree of variation in the diameter of the hose.

The continuous lead extrusion machine was designed and developed to eliminate the disadvantages of the stroke type press and is a radical departure from the design of the hydraulic press. As the operation is continuous, any lengths of sheathing can be extruded without stopping the machine which provides uniform lengths of hose. Since its introduction more than twenty years ago, this machine has proved its reliability in the wire and cable industry, but Quaker states that it is the first rubber manufacturers to adopt the process in the production of molded hose.

Advantages gained by continuous lead extrusion for molded hose are: freedom from stroke or billet change marks, more accurate size control and longer lengths of hose. These advantages also will mean substantial savings to Quaker customers in the form of one piece full length reels which eliminate the possibility of more than one remnant. Prior to this method, distributors had to take one, two or even three different lengths of hose to a reel.

U. S. Rubber Announces Textile Division Appointments

► Textile Division of the U. S. Rubber Co., New York, N. Y., has appointed Leslie G. Wrigley, formerly account manager of manufacturers sales, to the new position of sales manager of automotive sales. Benjamin E. Ferguson, previously sales manager for industrial and transportation fabrics, has been named to the new post of product development manager of automotive sales. Their headquarters will be located in the company's office at the New Center Building in Detroit, Mich. Mr. Wrigley joined U. S. Rubber in 1940 as a clerk in the Tire Sales Department in Detroit, Mich. In 1951, he became district sales manager of tire auto sales and in January, 1958, he was named account manager of manufacturers sales. Mr. Ferguson began his career with the company at Stark Mills in Hogansville, Ga., in 1939. From 1942 to 1946, he served with the U. S. Navy, later returning to Stark Mills, where he held various technical positions until his transfer to the Textile Division's central laboratory in Winnsboro, S. C., in 1949. He was promoted to the New York office in 1955.

Canadian News

► A significant milestone in the history of Polymer Corp. passed quietly and routinely on September 29. That day marked the fifteenth anniversary of the first commercial production of synthetic rubber in Canada. On September 29th, 1943, the first bale of rubber rolled off the Polymer finishing lines.

Built as a wartime emergency measure in 1942-43 by the government at a cost of $48 million, the plant was originally designed to produce 41,000 long tons of rubber a year. It was not long before it was producing rubber in excess of this designed capacity. Year-by-year, additions to plant and improvements in techniques and processing steadily increased production to 130,000 long tons in 1957.

Reflecting the growth of plant and production is the steady growth in Polymer's work force from about 1,800 during the war years to over 2,800. The annual payroll has correspondingly climbed from $4 million to more than $14 million in 1957.

During its first two years of operation, Polymer's market was channeled to defense needs in Canada and the United States. By the time hostilities ceased, the new chemical rubbers had proved that they were something more than an emergency stop-gap. Realizing that Polymer's synthetic rubbers could take a place in the competitive commercial field, Polymer management set out to establish markets abroad. Today, 70 per cent of total production is exported to world-wide markets in more than 60 countries.

To a great degree, Polymer's successful establishment in normal commercial competition may be attributed to a farsighted and aggressive research and development program. Instituted as early as 1945, it has increased the types and grades of Polysar rubbers from the original four, to twenty-three, and has been responsible for many technical and technological advances in the field of rubber chemistry and processing. Notable among the innovations credited to the program are "cold" nitrile rubbers; the first commercial production of self-reinforced rubber, "Polysar SS-250," and the introduction of butyl rubbers with compounding recipes practical for inner tubes for low temperature use.

Operating in a freely competitive atmosphere, Polymer has repaid the government, in the form of direct repayment on the original advance, and dividends, more than the original $48 million. In addition, it has paid $32 million in income taxes and financed all plant expansion and improvement out of earnings, with the result that the assets of the corporation now represent more than $109 million. Polymer operates like any other commercial enterprise, which must provide service and a quality product to its customers, pay fair wages and salaries, and return a reasonable profit to its shareholders—ultimately the Canadian taxpayer.

With a notable record of the past fifteen years' experience, Polymer looks ahead to a future of increasing competition from new synthetic rubber plants in four European countries as well as vigorous competition from United States producers. Plans for meeting these challenges mean an intensified marketing campaign, supported by an enterprising research and development program.

► The Ninth Canadian High Polymer Forum will be held on October 19-21, 1959, at the Guild Inn, Toronto, Ontario, Canada. The forum is sponsored by the National Research Council of Canada in cooperation with the Chemical Institute of Canada, and is devoted to all aspects of polymer science. Persons desiring to contribute papers to this meeting should contact the program chairman, Dr. L. A. McLeod, Research and Development Division, Polymer Corporation Limited, Sarnia, Ontario, Canada.

► Dow Chemical of Canada has announced plans to produce linear polyethylene at its Sarnia, Ont., plant. For the past two years, the company has been working on development of a modified linear polyethylene under the Ziegler or "low pressure" process. Dow expects to start production in 1959. Linear polyethylene is said to be distinguished from high pressure polyethylene by its greater resistance to heat, chemicals and vapor transmission, and its increased hardness, toughness and rigidity.

► Canadian Industries, Ltd., Montreal, Que., has begun construction of a new consolidated sales office at 4606 First St., S.E., in Calgary, on the same site now occupied by the company's consolidated warehouse. The $70,000 one-story building will house the Calgary sales staffs of the company's Paints, Chemicals, Explosives, and Ammunition Divisions.

► Kaufman Rubber Co., which is licensed by Ripple Sole Corp., to produce Ripple Soles in Canada, has introduced basketball shoes which feature this sole. The company stated that production of the new type basketball shoes was undertaken after completion of extensive tests which are said to have proved the versatility of the Ripple Sole over conventional footwear now worn by basketball players.

Wilbur E. Combs

Named Development Manager

► Wilbur E. Combs has been appointed manager of development for the Mechanical Goods Division of the U. S. Rubber Co., with headquarters in Passaic, N. J. Mr. Combs joined the company in 1945 as a special representative for the Mechanical Goods Division at the Kansas City branch. Afterwards, he held positions as a sales representative, sales engineer and assistant manager of V-belt sales at Dallas, Kansas City, and Philadelphia. In 1950, he was appointed manager of Gilmer V-belt sales at the Philadelphia plant and in 1952, he was transferred to Passaic, N. J., as sales manager for Gilmer products. He was assigned to the position of merchandise manager at the same location early in 1953 and a year later, he was appointed assistant manager of sales development at company headquarters in New York. Mr. Combs became sales promotion manager for the division at the Passaic plant and later, he was appointed manager of market research. In his new assignment, he will retain his responsibilities in market research. He has a B. S. degree in engineering from the University of Tulsa and was recently a student of marketing at the Columbia University School of Business.

Builds Plant in Brazil

► International B. F. Goodrich Co., Akron, Ohio, will build a plant on a 135-acre site in Campinas, Brazil, to manufacture tires, tubes, plastics and industrial rubber products for the automotive industry and the replacement market. Construction of the plant, to be completed in 1959, reflects the company's confidence in the continuing growth and development of Brazil and Latin America, a Goodrich spokesman said. The company is now associated with Latin American rubber manufacturing and chemical companies in Colombia, Cuba, Brazil, Mexico and Peru.

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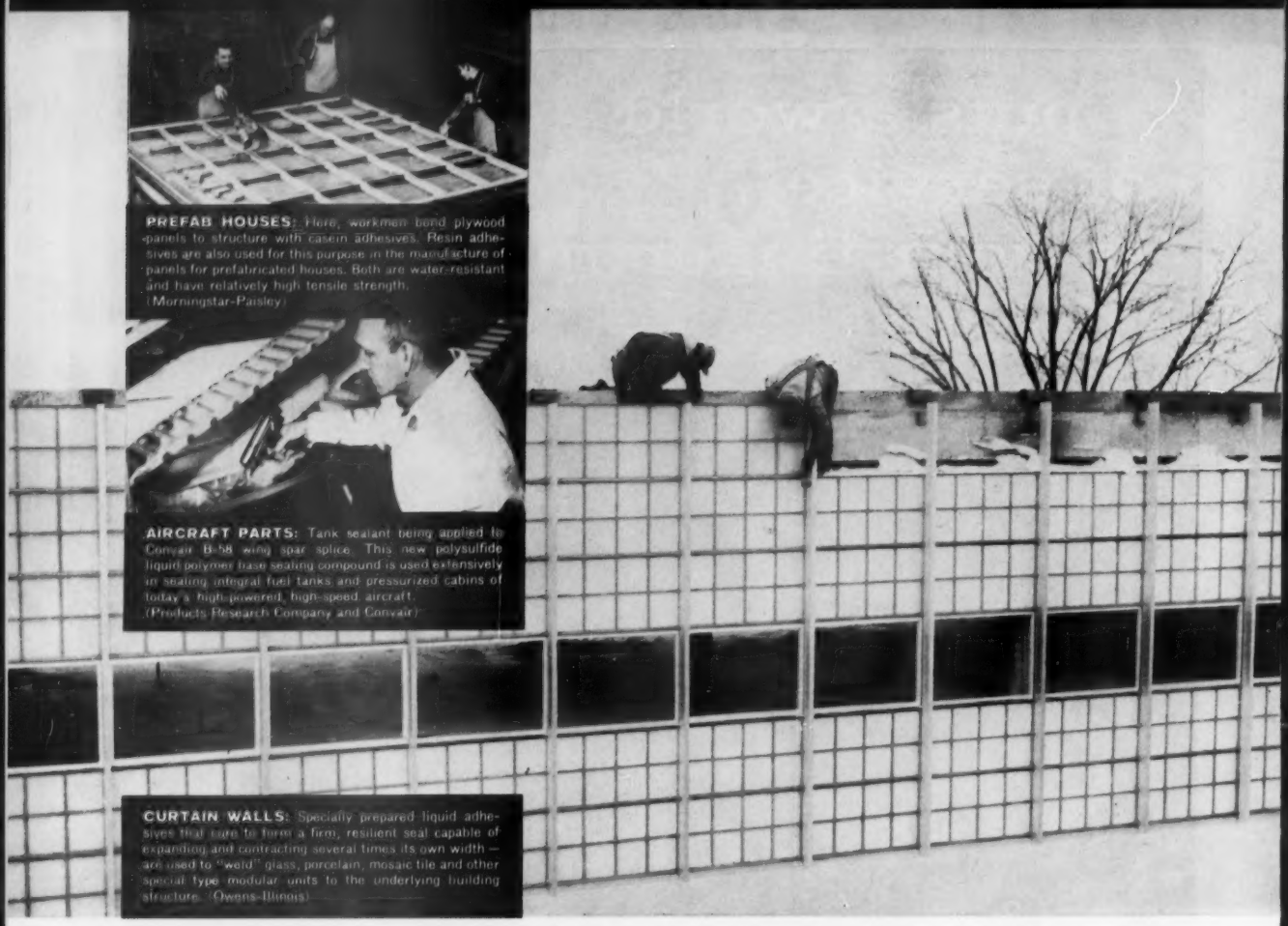

PREFAB HOUSES: Here, workmen bond plywood panels to structure with casein adhesives. Resin adhesives are also used for this purpose in the manufacture of panels for prefabricated houses. Both are water-resistant and have relatively high tensile strength. (Morningstar-Paisley)

AIRCRAFT PARTS: Tank sealant being applied to Convair B-58 wing spar splice. This new polysulfide liquid polymer base sealing compound is used extensively in sealing integral fuel tanks and pressurized cabins of today's high-powered, high-speed aircraft. (Products Research Company and Convair)

CURTAIN WALLS: Specially prepared liquid adhesives that cure to form a firm, resilient seal capable of expanding and contracting several times its own width — are used to "weld" glass, porcelain, mosaic tile and other special type modular units to the underlying building structure. (Owens-Illinois)

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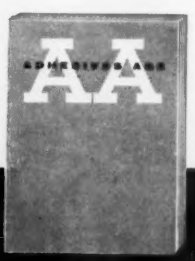

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ADHESIVES AGE NEW MAGAZINE

Sprout-Waldron Names Three

► Sprout-Waldron & Co., Inc., Muncy, Penna., has assigned Jack D. Wall, Richard J. Farrell and James E. Bahr as sales engineers at the feed, chemical and industrial plants in the Northeastern States. Mr. Wall was born in Peoria, Ill., and received special training in machine design at Bradley Polytech. Before joining Sprout-Waldron in 1955, he was employed by Allied Mills where he was responsible for the design and layout of feed milling systems and projects. Mr. Wall will cover the entire state of New York and concentrate on feed mill equipment and feed plant design.

Mr. Farrell came to Sprout-Waldron in 1957 after spending four years in the Research Development Section of Naugatuck Chemical. A native of Attleboro, Mass., Mr. Farrell is a graduate chemist from the Massachusetts Institute of Technology. He will concentrate on chemical and industrial equipment applications in the New England States. Mr. Bahr will be responsible for feed milling equipment and systems in the New England territory. He is a native of St. Louis, Mo., and received special training at Murray State Teachers College. His previous experience with Sprout-Waldron included handling the modern Inter-County Farmers' Cooperative feed mill project in Woodridge, N. Y.

Puncture Sealing Powder

► A rubber powder that is said to make any tubeless passenger tire puncture sealing has been introduced by the U. S. Rubber Co., New York, N. Y. U. S. Rubber states that a tubeless tire containing two-and-a-half ounces of the powder, called "Air Guard," can be driven for 48 hours or more after being punctured, even if the puncturing object has not been retained by the tire. The powder does not affect the repairability of the tire and does not change the balance or performance of the tire in any way. It retains its sealing efficiency for the life of the tire or until it is removed. The sealing powder works only in tubeless tires.

New Locations for Exide

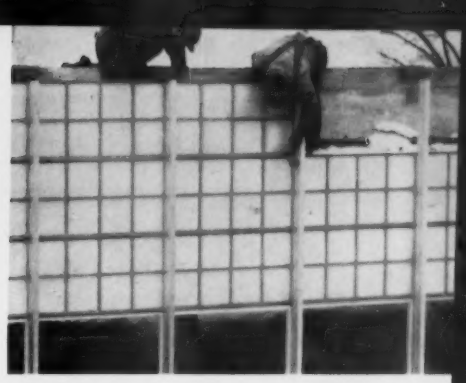
► The Electric Storage Battery Co. has moved its corporate general offices and the headquarters of its Exide Industrial Division to new Philadelphia locations. The administrative, sales and accounting departments of the Industrial Division are now located at the Philadelphia plant, Rising Sun and Adams Avenues. This consolidates the division's headquarters operations at its largest manufacturing facility. The corporate offices have moved to the eighth floor of Philadelphia's newest office building, No. 2 Penn Center Plaza at 15th Street and Pennsylvania Blvd.

Urethane Foams Gain

► More than 135 furniture companies are incorporating urethane foam cushioning in their lines, according to reports from the Winter Furniture Market, Chicago, Ill. Heritage Furniture, Inc., High Point, N. C., is now using urethane in all lines of upholstered furniture and Shaw Manufacturing Co., Charlotte, N. C., is also switching to the polyether type of urethane. Both companies say that this material is superior to any cushion now available because of its resiliency, light weight, superior resistance to cleaning solvents and lower cost. Crest, Inc., Asheville, N. C., one of the first companies to use the new material for backing and padding in place of conventional cotton, felt or sisal, says it reduces labor costs up to 35 per cent. The switchover to urethane from foam rubber is expected to precipitate a price battle between the two materials. Urethane sales are running at a fraction of plant capacity of such producers as Mobay Chemical Co., Allied Chemical Corp. and DuPont. Though it is said that at present no one is making profits, a spokesman for the chemical marketing field states, "It is a question of which comes first—the low price or the big market."

New Plastic Material Developed

► Hercules Powder Co., Wilmington, Del., and Godfrey L. Cabot, Inc., Boston, Mass., have jointly announced the development of a new polyethylene-carbon black plastic composition made by the chemical cross-linking of polyethylene and carbon black compounds. They state that compounds highly loaded with low-cost carbon black and polyethylene will be possible for the first time due to the development of "Di-Cup," Hercules' dicumyl peroxide and "Sterling MT," Cabot's thermal carbon black. Advantages claimed for plastics formed from this cross-linking include substantially improved strength; improved resistance to heat; greatly reduced environmental stress-cracking, and exceptionally high resistance to attack by weather, solvents and surface-active agents, with practically no sacrifice in the good low-temperature properties of polyethylene. The firms expect the use of "Hi-fax," Hercules' high density polyethylene, instead of conventional polyethylene to result in new plastic materials with even greater strength and heat resistance, as well as other advantages gained through chemical cross-linking.



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Obituaries

Theodore A. Werkenthin

► Theodore A. Werkenthin, chief of the Rubber Section of the Bureau of Ships Research and Development Division, died on October 7 in Doctors Hospital, Washington, D. C., after his second operation for cancer this year. Mr. Werkenthin was born in Berlin, Germany, on June 18, 1900, and was raised in Texas from his early boyhood. He attended the University of Texas, receiving his B. A. in 1921 and later his M. A. He also did post-graduate work on his doctorate at Texas University in 1924 and again in 1935 on various hydrocarbon polymers and resins derived from petroleum. Later, he taught both organic and inorganic chemistry at that University and afterwards served as head of the Chemistry Departments at Taylor University, Upland, Ind., and at Queens College, Charlotte, N. C.

Mr. Werkenthin entered industry when he joined the Solar Refining Co., Lima, Ohio, as a research chemist. He was also associated with the White Eagle (Socony) Refining Co., August, Kansas, as plant engineer; was technical superintendent with the Grayburg Oil Corp., San Antonio, Texas, and assistant chief chemist with the Deep Rock Oil Corp., Cushing, Okla. During his six years with Deep Rock Oil, he became interested in rubber manufacture and research in connection with the improvement of packing, gaskets, gasoline, oil hose, drilling equipment, rubber solvents and diluents made from petroleum.

The Rubber Laboratory at Mare Island was conceived and administered by Mr. Werkenthin through the Rubber Section, which was then under the Bureau of Construction and Repair and is now under Code 344 of the Bureau of Ships. The Munitions Board had assigned to the Rubber Section the task of evaluating pre-war German synthetic rubber and the newly developed American synthetic and natural rubbers. Much of the information compiled there became the background for the famous Baruch Report that for many years determined all policy for the rubber industry and all interested government departments.

Mr. Werkenthin became associated with the Navy in 1937, working with chemicals, rubber, decking materials and plastics. His experience with both petroleum and rubber proved to be of extreme value during the rubber conversion, when the country had to look to petroleum for most of its synthetic rubber. He built up the Bureau of Ships' rubber interests since 1937 so that it now includes four rubber manufacturing shops, and eight laboratories equipped for rubber testing, compounding, development and research. Numerous patents and nearly fifty technical publications attest to the importance of this work to the rubber industry.

In 1945, the Navy awarded Mr. Werkenthin the Meritorious Civilian Service Certificate of Award for his outstanding work on rubber during World War II. He was also presented with the Distinguished Civilian Service Award by Under Secretary of the Navy, F. P. Whitehair, on November 13, 1951. Mr. Werkenthin was a registered professional chemical engineer in the District of Columbia.

Active in many organizations, Mr. Werkenthin was a member of the American Society of Naval Engineers, the Society of Sigma Xi, and Phi Lambda Upsilon Honorary Chemical Society. He was a member of the advisory committee and a former director of the Rubber Division of the American Chemical Society, being on the liaison committee of the former. Other organizations included the Scientific Research Society of America (RESA); Petroleum Division of A. C. S., and the American Association for the Advancement of Science. He was the founder and first president of the Washington Rubber Group and the official representative of the Rubber Division of A. C. S. Recently, Mr. Werkenthin was elected a Fellow of the Institution of the Rubber Industry of London, England. He is survived by his wife.

Bernard Del Guerra

► Bernard Del Guerra, purchasing agent for the Los Angeles Standard Rubber Co., died on August 29 after a prolonged illness caused by a rheumatic heart condition. He was 63 years old. Born in Manchester, England, Mr. Del Guerra came to the United States in 1929 and was employed by the Goodyear Tire & Rubber Co. prior to joining Los Angeles Standard. He went to Los Angeles Standard in 1943 as foreman of the Tubing Department.

Theodore T. Cowen

► Theodore T. Cowen, who had been associated with the rubber industry since 1919, died on September 11 after a long illness. He was 61 years old. Mr. Cowen was born in Cambridge, Mass., where he attended the Cambridge Latin High School. Later, he attended Akron University and was graduated in 1916. Mr. Cowen joined the Boston Woven Hose Co. in 1919, after serving in World War I as an ambulance driver in France. In 1921, he established the Pine Tree State Rubber Co. in Sabbatus, Maine, and following this, he started the Old Town Rubber Co., Old Town, Maine. Later, he joined the Norwalk Rubber Co., to take charge of the Heel and Sole Department and afterwards went to Mexico, where he operated a mechanical goods plant. When Mr. Cowen returned to the United States, he was employed by the Hawkeye Rubber Co., Cedar Rapids, Iowa, as plant superintendent. From there, he joined L. M. Bickett, Watertown, Wisc., as a plant technical man. Mr. Cowen retired from the company two years ago because of ill health. He is survived by his wife, a son and a daughter.

Clark Harrison

► Clark W. Harrison of Rose Valley, Penna., former president of the Bloomingdale Rubber Co. of Chester, Penna., died on September 16 in Delaware County Hospital at Drexel Hill, Penna. He was 90 years old. Mr. Harrison, who was born in Glasgow, Mo., graduated from Washington University in St. Louis. In 1899 he became foreign sales manager of the U. S. Cast Iron Pipe & Foundry Co., with headquarters in London. In 1911, Mr. Harrison returned to this country as treasurer and manager of Bloomingdale Rubber and was elected president of the firm in 1919. He had also been president of the Rubber Reclaimers Association. He was a member of the Governors Island, the Engineers and the University clubs of New York. He is survived by a daughter.

Wilson J. Kite

► Wilson J. Kite, Jr., purchasing agent of chemicals and miscellaneous commodities for the Plastics & Coal Chemicals Division of Allied Chemical Corp., died on August 22. He was 65 years old. A veteran of 52 years with the firm, Mr. Kite began his business career in Philadelphia in 1906 serving in various plant capacities and was transferred to the New York office as a buyer in 1922. For the past several years he had acted as purchasing agent for the Division. Mr. Kite was a member of the Purchasing Agents Association of New York, the American Gas Association, and the Pennsylvania and Southeastern Gas Association. He was a Master in the Guild of Ancient Supplers.

Enjay Butyl is used in General Electric washers and refrigerators because it offers economy and outstanding all-round quality performance.

ENJAY BUTYL

helps make more efficient appliances!

General Electric uses gaskets and hoses made of Enjay Butyl in their new washers and refrigerators.

Enjay Butyl parts are highly resistant to heat . . . aging . . . moisture detergents, bleaches and other chemicals. As a result, equipment lasts longer, performs better.

Technicians constantly find new ways to use Enjay Butyl in a great variety of applications—*and at lower costs!* It will pay you to investigate the possibilities of this versatile rubber in *your* product. For full information and expert technical assistance, write or wire the Enjay Company.

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Enjay Butyl is the greatest rubber value in the world. It's the super-durable rubber with outstanding resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

Pioneer in Petrochemicals

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Mfrs. of Slitters, Web Guides, Rewinding and Constant Tension Equipment

New Goods

Portable Sky Camp

► Sky Camp, Inc., South Gate, Calif., has introduced a portable camping outfit, complete with a room-size tent made of U.S. Rubber "Fiberthin", that fits into a compact aluminum case and rides atop the family auto. Five minutes of easy handling converts the aluminum case into a comfortable field home with table, chairs, cots, stove with bottled gas, and even a kitchen sink

with running water. The aluminum carrying case rides only 10-inches above a special car rack. To set up housekeeping, the camper pulls the case, which rolls off its tracks and down to the ground to stand upright, and serves as one side of the tent. When fully set up, the tent forms a room 8 x 13, by 8-feet high. The Sky Camp has a door that can be zipped up and two 4 x 5-foot windows with screening and zipper flaps. It is designed to keep the enclosure light and cool, yet able to be heated with only a small lantern in cool weather.

Synthetic Letterpress Rollers

► Letterpress rollers using a new synthetic material are being manufactured by the Roller Division of the Dayton Rubber Co., Dayton, Ohio. The new roller, called "Daycollan" has unusual characteristics for ink distribution and easy wash-up. The rollers are non-porous and will not absorb ink. They can be changed from printing black to pastel colored inks without bleed back. A single wipe with kerosene is usually sufficient to remove the ink film. Cast to size, the rollers are perfectly round and entirely free of surface imperfections. They are not affected by temperature, humidity or internal heat build-up from prolonged press runs. The synthetic material increases abrasion and wear resistance for longer roller life. At present, the Daycollan rollers are being manufactured for all sheet-fed press sizes. As more molds become available, larger press sizes will be produced.

How to squeeze out the last ounce of profit

Consider the cost savings that are often possible with CUMAR® Resins. Because they improve mold release and extrusion properties, production rates go up. Because they permit high loading, materials costs go down.

Cost savings flow naturally from the use of "CUMAR" Resins as a processing aid, softener or extender. Rubber compounders use it to attain high electrical resistance in insulations . . . a "leatherizing" effect in soles and heels . . . attractive sheen for molded rubber housewares.

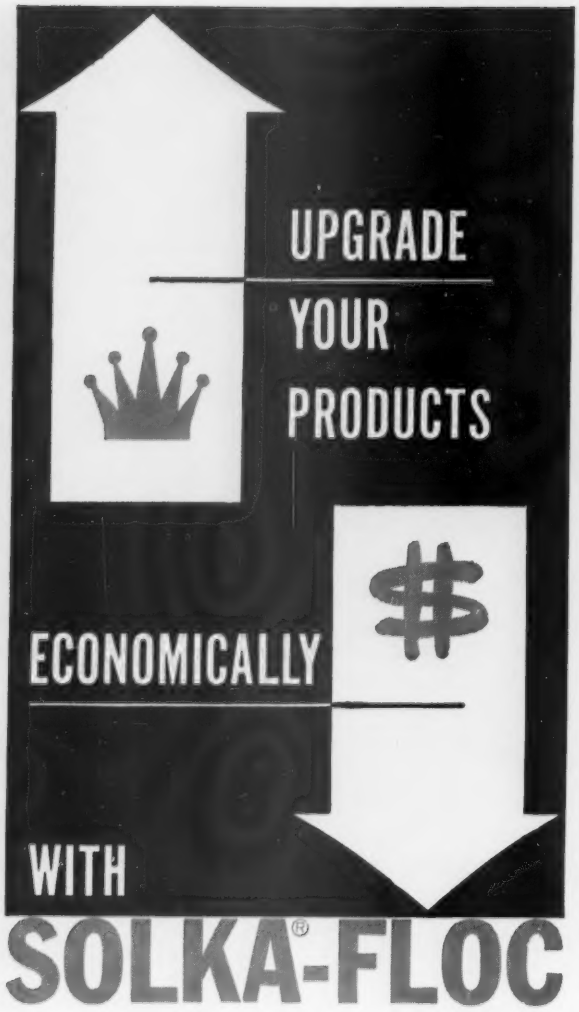
Here are some other desirable properties which these paracoumarone-indene resins impart to practically all rubber compounds.

- High plasticity with lower modulus
- Improved processing, calendering and tubing properties
- Permanent tackiness in uncured stocks
- Improved mold flow and better finish
- High loading possible without degradation
- Low scorching tendencies
- Good storage properties

In addition to "CUMAR" Resins, we have developed a number of hydrocarbons and oils for use in rubber compounding. You name the specific properties you want in your stock. Our technical staff will recommend proper ingredients. For samples of products, or technical assistance, call our local representative—or contact us direct.

PLASTICS AND COAL CHEMICALS DIVISION
Formerly part of the Barrett Division
40 Rector Street, New York 6, N. Y.

Allied Chemical



This finely divided highly purified wood cellulose has many applications. It can:

- **Lower cost**
- **Improve surface**
- **Reduce shrinkage, kill nerve**
- **Control dimensional stability**
- **Regulate hardness and flex life**
- **Aid processing**

Available in a wide range of grades to give special properties to a multitude of rubber and plastic end products such as rubber soles, floor tile, rubber toys, car floor mats, phonograph records, etc. Write us about your special process problems. Address Dept. GF-11, our Boston office.

BROWN COMPANY

150 Causeway Street, Boston 14, Mass.
Mills: Berlin & Gorham, New Hampshire

Sold in Canada by
Brown Forests Products, Ltd., Montreal, Que. (ALPHA-FLOC)

Para-Vinl Shoe Soling

► "Para-Vinl", a stitchable new safety shoe soling material proved super resistant to heat, oil, acids and caustics, has been developed by Gro-Cord Rubber Co. of Lima, Ohio and Tillsonburg, Ontario. This versatile material for work and safety shoes was tested in automotive plants, construction equipment manufacturing plants and chemical plants, and was put into prolonged use

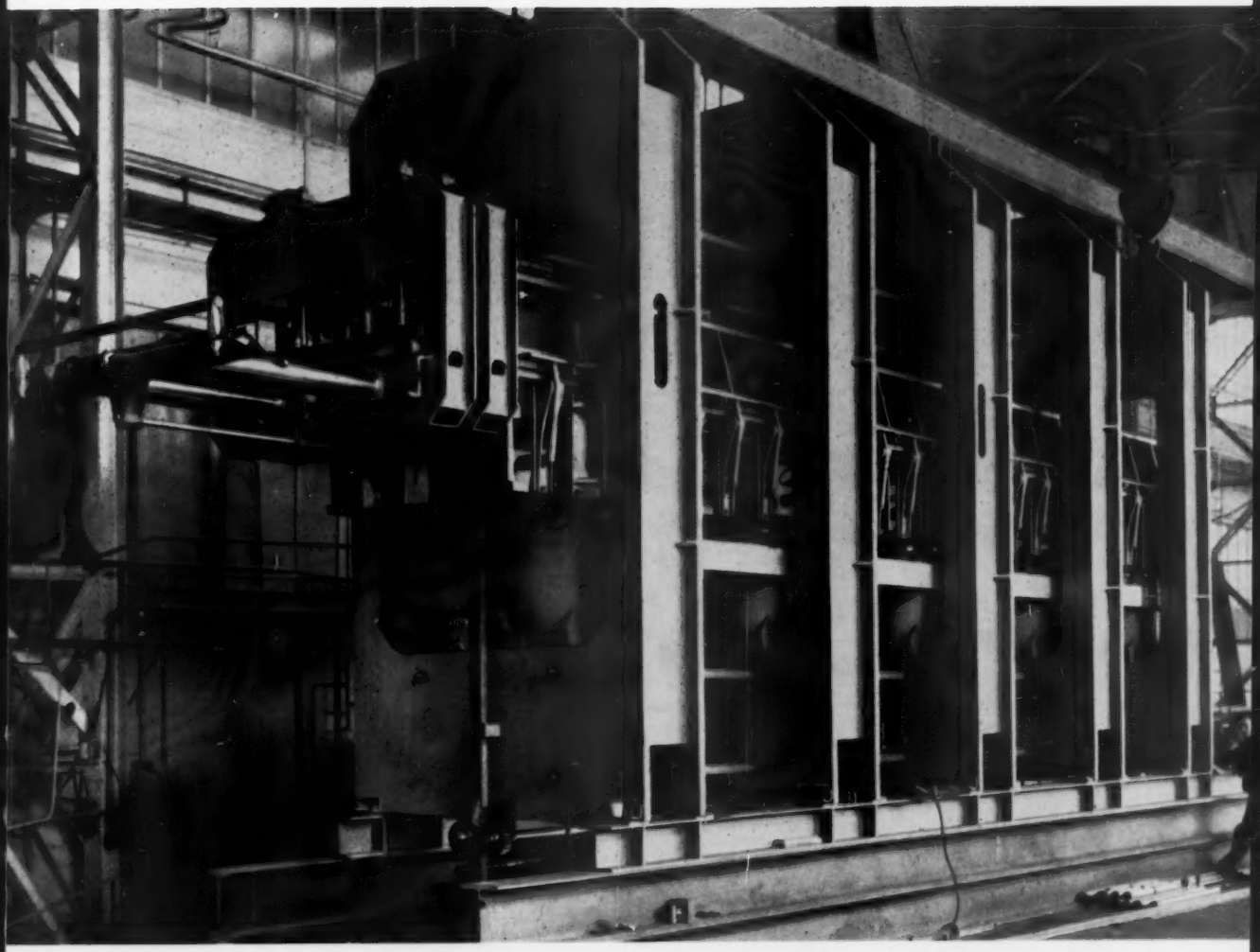
by policemen and firemen. Test results showed that Para-Vinl outwore the uppers on the highest-quality work shoes available. These tests, conducted under unusually abusive underfoot conditions, further showed that Para-Vinl has positive slip resistance and excellent low-temperature flex. Para-Vinl is made from Paracril O.Z.O., a product of the Naugatuck Division of U. S. Rubber. Ideal for work and safety shoes, dress shoes, women's casuals and children's shoes, Para-Vinl will be available in molded design soles, molded plain soles, sheet stock, top lifting, and blanks for the Cema process; in black, brown and oak colors.

Shower Stall Mat

► Rubbermaid Inc., Wooster, Ohio, has introduced the "Rubbermaid Shower Stall Mat" designed to add to the pleasure — as well as the safety—of guests at hotels and motels. Possessing the attractive appearance of the "Rubbermaid Bathmat," which is used in many homes, the new Shower Stall Mat has heavy duty construction for institution use. The underside pattern of safety-cups clings firmly to the shower floor, providing safe footing and reducing liability risks. Measuring 22¼ x 22¼ inches, it is flexible, easy to handle, and perforations on the mat provide for quick and complete drainage. The new mat is available in white, marbleized black, pink and light green.

Barr Vinyl Football

► Barr Rubber Products Co., Sandusky, Ohio, is producing a 9 inch long vinyl football with a 5 inch diameter. This new football is designed to take a beating from the junior varsity set. It comes in red, yellow, blue and brown colors, all with end bands in contrasting colors.



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We supply belting presses with a working width up to 10 feet.

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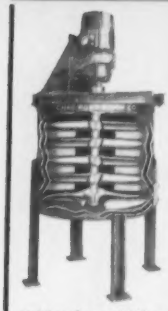
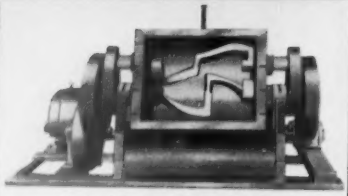
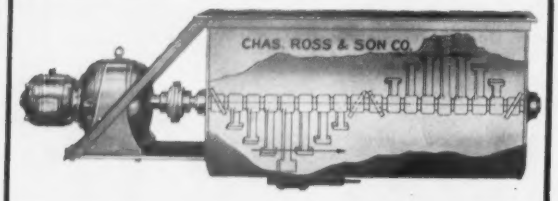
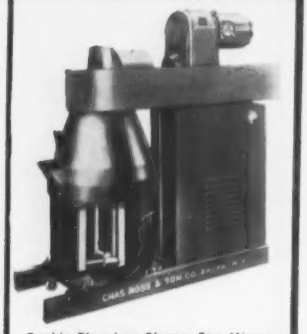
RUBBER PROCESSING MACHINERY
gives better results in less time!

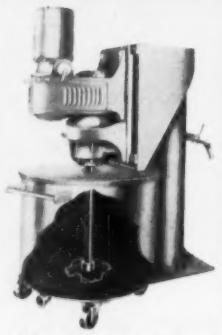

Rubber Cement Mixers
100 - 1000 Gal. sizes

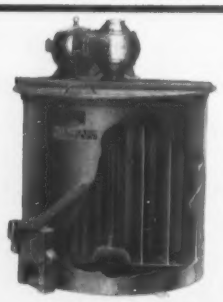

Heavy Duty Double Arm Kneaders
1 pint - 150 Gal. sizes

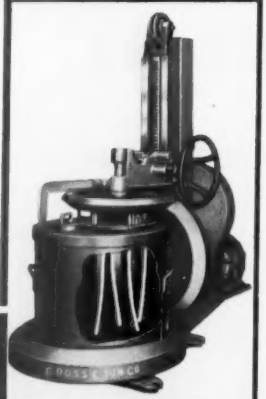
Rubber Reclaiming Mixers
100 - 1000 Gal. sizes




Double Planetary Change Can Mixers
1 - 150 Gal. sizes


High Speed Change Tank-Mixers
80 - 250 Gal. sizes


Heavy Duty Paste Mixers
25-1000 Gal. sizes


Heavy Duty Change Can Mixers
8 - 60 Gal. sizes

Almost a century of furnishing *Heavy Duty* dependable equipment to the rubber industry.

Write for Complete information!

CHARLES ROSS & SON COMPANY, INC.
Dept. R. 148-156 Classon Ave., Brooklyn 5, N. Y.

Green Pack Canning Belt

► A new canning belt that is said to have three times the moisture resistance of other belts used in the canning industry is being produced by B. F. Goodrich Industrial Products Co., Akron, Ohio. The company's new "Hydroseal" fabric treatment protects internal reinforcement of the belt from moisture-induced rot, a major cause of failure in conventional canning belts. A rubber coating between the fabric plies offers additional protection against moisture and increases flexing life of the belt. The belts are the first ever made with inhibitor-protected rubber that resists most fungi and molds known to cause sanitation problems in canning plants.

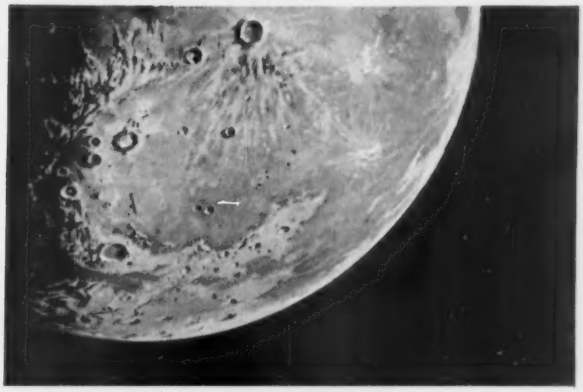
The new belt is "eye rest" green in color, a shade selected on the basis of studies made by specialists in industrial color. This green is easy on the eyes and increases inspection line efficiency. The color cannot wear off since the green is dispersed throughout the rubber compound, not confined to surface only. To obtain extra-smooth surfaces for easier cleaning and reduced maintenance costs, belts are molded against polished steel plates. Belts are available in any length, widths up to 48 inches, with from two to four plies of fabric reinforcement.

Durable Traffic Cones

► Industrial Products Company, Philadelphia, Penna., announces a new line of traffic cones made of tough, durable rubber to withstand hard wear and abuse. The cones are made in three sizes: 12, 18, 24 inches, and are finished with special rubber base paint in yellow, black and

red color combination. The shell type construction allows for stacking, requiring minimum space when not in use. Signs and flags can be inserted in the top opening of the cones. The cones are available either plain or reflectorized, and can be used for traffic channeling on streets and highways, and for guarding construction and repair operations.

Naugatuck NAUGAPOL SPECIALLY-PROCESSED SBR POLYMERS



dry . . . . . drier . . . . . DRIEST

DRYNESS in all the above examples stems from lack of moisture in the surrounding environment. Naugapol® styrene-butadiene rubber, on the other hand, is dry—and stays dry—*in spite of* surrounding moisture!

That's because we specially process all eight types* of Naugapol polymers to eliminate moisture-absorbing salts. Acid is used in place of salt as the coagulant following polymerization, and extra straining and milling further remove water solubles. As a result these premium grades of rubber are noted for their:

- **HIGH DIELECTRIC PROPERTIES**
- **LOW ASH CONTENT**
- **EASY PROCESSING**

These properties make Naugapol polymers ideal for use in the extruding of wire and cable insulation and the manufacture of mechanical rubber goods where low moisture absorption properties are required. For more details on these and other special grades of synthetic rubber, write us about your requirements.

*Naugapols are made in types 1016, 1018, 1019, 1021, 1022, 1023, 1503 and 1504.

Naugatuck Chemical

1122-N. Elm St.

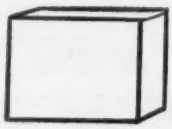
Division of United States Rubber Company, Naugatuck, Connecticut

US RUBBER

Rubber Chemicals · Synthetic Rubber · Plastics · Agricultural Chemicals · Reclaimed Rubber · Latices · CANADA: Naugatuck Chemicals Division, Dominion Rubber Co., Ltd., Elmira, Ontario · CABLE: Rubexport, N.Y.

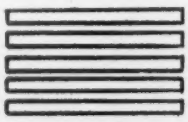
What's your RUBBER CUTTING PROBLEM

To cut stock into 5" squares?



To cut sheets into 1/8" cubes?

To cut sheets into strips from 1/64" to several inches wide?



Loading slabs of natural or synthetic rubber on the feed apron of a Taylor-Stiles Cutter.

No matter what your cutting problem may be — Taylor-Stiles cutters will help you solve it.

Taylor-Stiles machines cut hard rubber and soft — natural and synthetic — cleanly, accurately in large volume, and discharge it freely without wrapping around the knives.

Taylor-Stiles method of feeding and shear cutting — the result of years of experience in cutting literally hundreds of products will help improve your output and reduce your operating costs.

Do not suffer ragged cutting, small volume output, wrapping around knives — or costly inefficient hand methods of cutting.

Write today for our folder App. 202 with full details of our rubber cutters. It will point the way to improve your operations and lower your costs.

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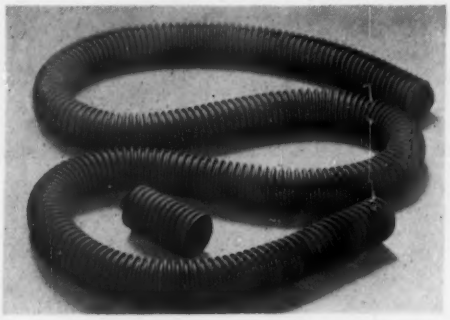
216 BRIDGE STREET, RIEGELSVILLE, NEW JERSEY

Neoprene Multi-Purpose Hose

► Extreme flexibility and high resistance to deterioration make a new neoprene industrial hose, produced by Burton Manufacturing Co., Burton, Ohio, adaptable to a wide range of industrial usage. Some applications for the hose include use as flexible duct for exhausting fumes, vapors, dust and mists; flexible hose for low pressure conveying of powdered materials; and flexible connections on machinery for handling air or gases. Extruded in continuous, seamless lengths, the flexible hose features a spiral-ribbed construction enabling it to retain its circular cross section even when subjected to sharp bends, and it can be crushed without damage. The use of neoprene elastomer gives it resistance to oxidation, ozone, oils, dilute acids, sunlight and heat aging, and abrasion. It is produced in 2, 2½ and 3-inch diameters in lengths to 11 feet. Connector sections, into which the hose screws, are available for assembly of longer lengths.



Naugahyde Upholstery Material

► U. S. Rubber Co., 1230 Avenue of the Americas, New York, N. Y., announces a new line of Elastic Naugahyde upholstery material which has the look and hand of rich brocade, yet is washable and durable. The new upholstery, called "Roma", has a strong, elastic jersey backing making it easy for upholsterers to use round contours. It is 54 inches wide, 27 ounces in weight and is being sold in 30-yard rolls. Made in Mishawaka, Ind., the upholstery comes in 10 colors.

Barr Trail-O-Balloons

► New "Trail-O-Balloons", arranged twelve to a 47-inch long cellophane display trail, have been introduced by the Barr Rubber Products Co., Sandusky, Ohio. The balloons are in assorted colors in knobby, serpentine and spiral styles. The package lends itself to hanging, stripped on a counter or folded. It can be handled as a lightweight cardboard display stand that holds siz dozen Trail-O-Balloon packs.

Retarder PD Safeguards Borderline Scorch

► Borderline scorch conditions result from many processing techniques in rubber compounding. Whether due to equipment design and arrangement, enforced processing economy barring use of more effective but higher priced delayed-action accelerators, or a combination of factors, the result is lack of flexibility in processing safety. Many footwear, flooring and mechanical items are in this category where small changes of temperature can produce excessive rejects due to scorch. An effective answer is Cyanamid's Retarder PD, phthalic anhydride with a modifier and anti-dusting agent. This rubber chemical retards scorch during processing without affecting the cure cycle. It is particularly effective with thiazole accelerators or combinations of thiazole and guanidine accelerators providing safety margin at minimum cost.

Old Face, New Form . . . CYDAC* Acclerator Flaked

► The chemical represented by CYDAC Accelerator Flaked has been used by the rubber industry for many years as a medium delayed-action accelerator. Nevertheless, the recently introduced CYDAC is rapidly making a name for itself in the industry. Its flaked form offers easier handling, eliminates bridging in conveyor equipment, insures

a minimum of dusting . . . all *plus* values gained with no sacrifice in processing or aging properties. With increased automation in compounding, Cyanamid's CYDAC is a valuable tool for both processing and design engineers and the compounder.

* Trademark

DIBS® Tames Rising Temperature in New Technique

► Carbon black masterbatching is beginning to have its effect on the rubber industry. In this new process, carbon black is dispersed in liquid latex prior to coagulation, permitting incorporation of greater amounts of HAF and ISAF blacks than by dry milling. This, in turn, causes a definite tendency toward increased processing temperatures. Outstanding delaying action of Cyanamid's DIBS Accelerator solves the problem, protects the batch from premature vulcanization and still provides maximum activity during cure.

Advertisement

DIBS®...the Ultimate in Delayed-Action Accelerators

Developed especially for use with the newer ISAF and SAF reinforcing furnace blacks, DIBS Delayed-action Accelerator insures the maximum in processing safety combined with good acceleration activity at temperatures of 280° F and above.

DIBS is easily dispersed in rubber and provides excellent cured physical properties.

Ask your Cyanamid Rubber Chemicals representative for details of this outstanding accelerator.

CYANAMID

AMERICAN CYANAMID COMPANY
Rubber Chemicals Department
Bound Brook, New Jersey

SALES REPRESENTATIVES AND WAREHOUSE STOCKS: Akron Chemical Company, Akron, Ohio • H. M. Royal, Inc., Trenton, N. J. • H. M. Royal, Inc., Los Angeles, Calif. • Ernest Jacoby & Company, Inc., Boston, Mass. • Herron & Meyer of Chicago, Chicago, Illinois
In Canada: St. Lawrence Chemical Company, Ltd., Montreal and Toronto

Best scorch protection yet . . .

MAGLITE® D

The performance-proved magnesium oxide

Recent tests in the Merck Rubber Research Laboratories conclusively prove that MAGLITE D provides better scorch protection in neoprene compounds than other reactive magnesium oxides on the market. Additionally, it occupies only about one-third the warehouse space as many of the lightweight, reactive magnesium oxides. You can always count on uniformity of chemical and physical characteristics, ease of dispersion, practical cure rates, and speedy delivery when you specify the MAGLITE brand. MAGLITE D is ideal for compounding neoprene and Hypalon. MAGLITE K, L, or M is particularly well-suited for other elastomers and for certain product or process requirements. Stocks of all MAGLITE products are quickly available from 15 strategically located warehouses.

For further information and samples—write MERCK & CO., INC., Marine Magnesium Division, Department RA-11, Rahway, N. J.

MERCK

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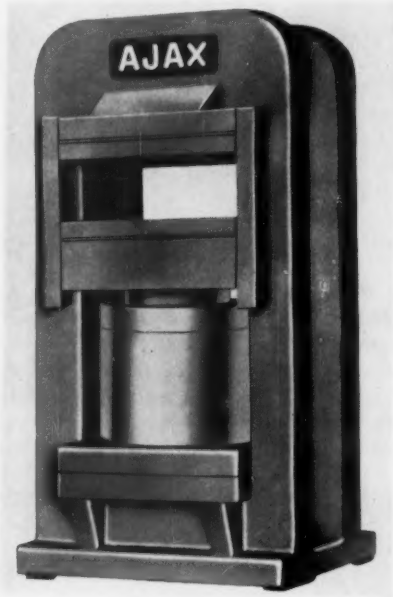
G. S. ROBINS & CO., INC.

WHITTAKER, CLARK & DANIELS, INC.

New Equipment

Ajax Hydraulic Presses

► Ajax Manufacturing Co., 1441 Chardon Road, Cleveland 17, Ohio, has introduced a completely new line of hydraulic presses for the rubber and plastics industries. The presses are built as standard models, or designed to meet customer specifications. Improvements incorporated into the Ajax press to give more accurate molding with a reduction in costs include a rolled steel frame constructed from solid plates. This frame is said to provide extreme rigidity and high strength for dependability and long service, and to reduce maintenance to a minimum. Special features built into the presses include chromed steel rams, bronze replaceable liners, adjustable guides for easy adjustment and removal, and a removable ram and pot. The presses are available with various ram diameters, platen sizes, strokes and openings.



Atomic Sales Drum Burnerator

► A new machine for cleaning drums has been introduced by Atomic Sales Corp., 1713 West Farms Road, New York 60, N. Y. Hard to clean open head drums containing rubber or other materials are said to be burned out in less than a minute by using a Drum Burnerator. The drum is automatically lifted into an upside down position and heated by radiation so that the residue is forced off and dropped into a water tank below. One man can clean 40 drums an hour, according to the manufacturer.

Speed Up Small Parts Inspection!

NEW Hopper Loader

Ideal for small parts, moldings, etc., the GOODMAN Vibratory Feed INSPECTION TABLE pays for itself in a few months! Inspection is much faster, yet requires fewer operators. Work flow is smoother, quality control improved, inspector fatigue reduced. An efficient addition to every inspection department.

- Vibratory Feed for Even Flow
- Selective Rate of Feed
- New Easy Load Hopper
- Variable Center Drop Turns Work Over
- Adjustable Belt Speeds
- Adaptable for Special Requirements

USERS REPORT:

- "Two girls are now doing the work of eight."
- "We run 55,000 small or 12,000 large moldings per hour."
- "In an emergency we inspected 250,000 moldings in just 2 hours, with four inspectors."

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G. F. GOODMAN & SON 401 Richmond Street, Philadelphia 25, Pa.

You Can DEPEND On
GENERAL PORCELAIN GLOVE FORMS

Year in, year out, the same unvarying quality—smooth, gleaming glove forms free from defects. And not only that, if you wish to reorder at any time you will be *sure* of getting an exact duplication of your first order.

Our specially trained, skilled labor turns out the finest forms made anywhere. Only perfect forms pass our rigid inspection.

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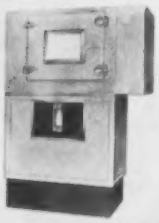

15-750 pphm (750-35000 pphm by special order)

Reliable concentration measurement thru titration

Full 5.7 cu. ft. oven

Accommodates MDC Dynamat (Rubber Stretching Apparatus)

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► The Bareiss-Exacta portable hard rubber tester, manufactured by Heinrich Bareiss, Apparatebau, Oberdischingen, Wurtt., West Germany, is a pocket-size instrument used to determine the

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Falls Engineering Roller Die Cutter

► Falls Engineering and Machine Co., Cuyahoga Falls, Ohio, offers a heavy duty roller die cutter with a recently developed die handling mechanism. The machine has been successfully used to die cut rolls and slabs of such materials as polyether foam, closed and open cell sponge rubber, foam rubber, high density soling and uncured rubber stocks, according to the manufacturer. Material can be die cut any of three ways: The standard method may be used with the dies on the bed of the machine, stock on top of the dies and the roller passing over the stock to make the cut. A second way is to mount the dies in a steel frame vertically above the bed area with the stock on the bed of the machine. The frame lowers to meet the stock, pre-compressing it and the roller passes over the back of the dies. A third method also places the dies on the bed of the machine, stock on top of the dies, and a plywood board faced with stainless steel is mounted in the steel frame. The plywood board lowers automatically, meeting the stock, and the roller passes over the board. This last method is said to increase die life.

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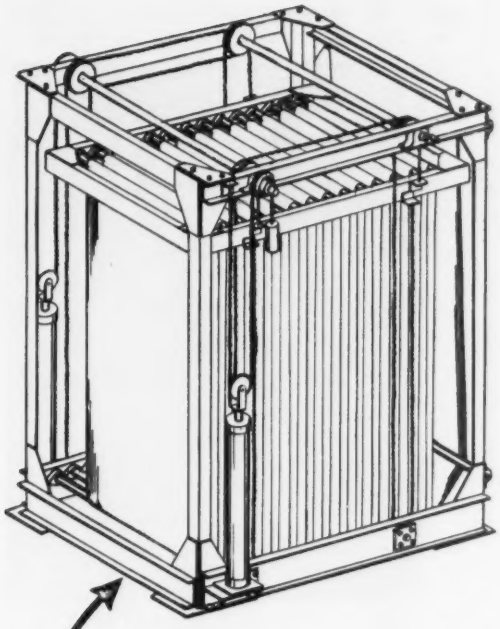

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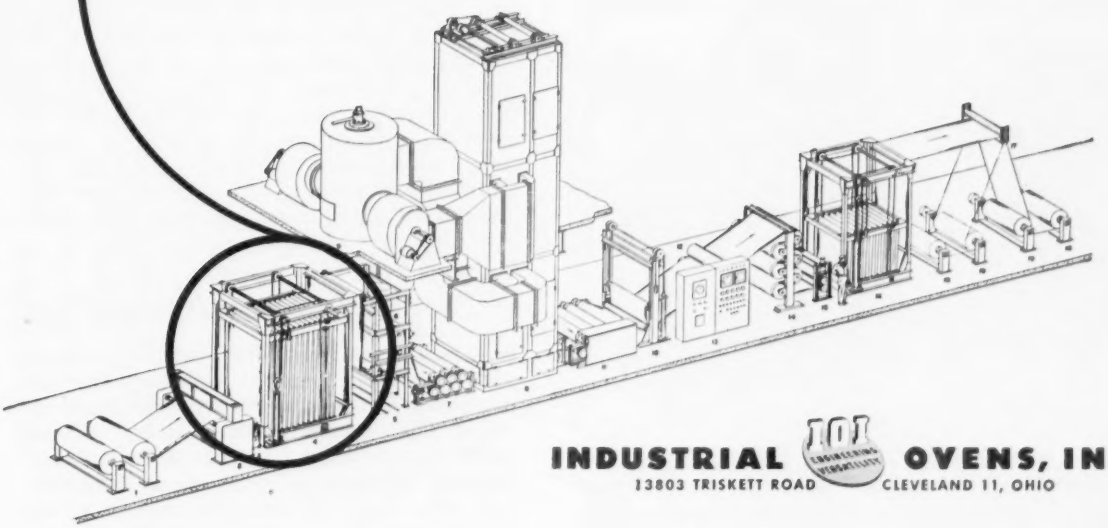

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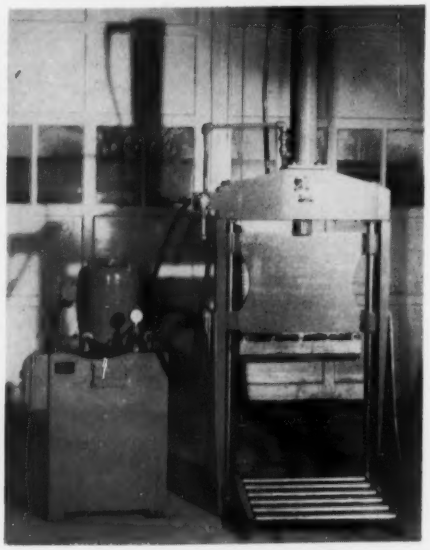
► Snow Manufacturing Co., Westwood, N. J., produces a self-contained hydraulic crude rubber bale cutter which contains all controls such as gauge, connections, oil level sight, breather cap, drain plug and motor for 220-440 volts, three-phase, 60 cycle, unless otherwise specified. A



safety feature of the cutter is that the operator is required to have his hand on the control valve at all times; the instant he removes his hand, the blade comes to a stop. The blade is also designed so as not to creep or drop. The machine features a welded frame and four bearing supports. The knife rides on ground rods. A positive stop control gives positive action for depth of cutting. The cutter blade is bolted for easy removal to sharpen. The power cylinder is made of the finest tubing, properly microhoned, according to the manufacturer. The cylinder is five inches in diameter with a 24-inch stroke. The cylinder rod is chromium plated for greater life. A conveyor on the rear has permanently lubricated ball bearing rollers, which makes for easy advance of the bale into the cutter and better control of slice thickness, which may be thick or thin.

OPW-Jordan Pressure Reducing Valve

► A new handwheel and ball bearing adjusting screw assembly, complete with finger-operated teardrop lock nut, are now standard equipment on all OPW-Jordan piloted pressure reducing valves, manufactured by Jordan Industrial Sales Division, OPW Corp., 6013 Wiehe Road, Cincinnati 13, Ohio. Besides allowing simple and precise setting of control pressures without tools, the ball bearing movement is said to eliminate

torque force on the main spring, allowing more accurate regulation. The valves are available in ½ to 2½-inch sizes, 250 psi bronze, and 125 psi iron.

Allied Engineering Hydraulic Press

► A 700-ton, double-acting hydraulic press designed to hold parallelism to less than .002-inch over the full area under full load has been designed and built by Allied Engineering and Production Corp., 2421 Blanding Ave., Alameda, Calif. Other specifications of the press are: down-acting, 21-inch daylight, 15-inch stroke, useable

platen area of 26 x 30 inches. The moving platen is precision guided on four alloy strain rods which are hardened, ground and chrome-plated. All bearing surfaces are booted with accordion type dust protectors. The press weighs approximately nine tons and covers a 3 x 3-foot floor area. Strokes up to 60 inches and controls to fit individual requirements are available. The press may be obtained with multiple platens and with platens for steam heating, electric heating and water cooling.

► The Gardner Colorgard, manufactured by Gardner Laboratory, Inc., P. O. Box 5728, Bethesda 14, Maryland, is a new **automatic colorimeter** adaptable to the production control of the color of rubber and other materials. After each reading is taken and an actuating button released, the instrument automatically restandardizes itself.

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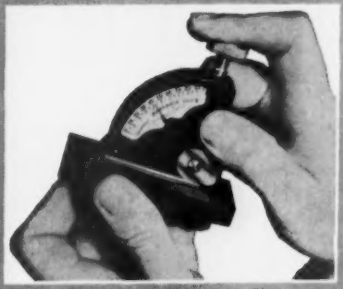

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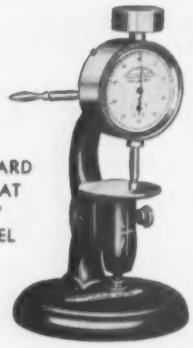

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Reviews

The Vanderbilt Rubber Handbook. Edited by George G. Winspear. Published by R. T. Vanderbilt Co., Inc., 230 Park Ave., New York, N. Y. 5¼ x 8½ in. 622 pp.

EDITOR'S NOTE: This handbook is distributed without cost to people in the rubber industry to whom it has specific value. To all others it is available at a price of $15.00 per copy.

The tenth edition of the "Vanderbilt Rubber Handbook," ably edited by George G. Winspear, is now being distributed to rubber consumers. It appears ten years after the previous edition. This publication has been for years a ready reference for rubber chemists, technologists and compounders. It has been used as a textbook in courses on rubber technology and should be required reading for one entering the industry.

The 1948 Handbook contained about 90 pages on latex and its compounding. In 1954, a separate handbook was issued covering this subject.

The present edition, comprising 596 pages of text and a comprehensive index, is largely rewritten and arranged in logical sequence. Much of the material is the product of the R. T. Vanderbilt Co., Inc. staff, but twenty-two other authors, experts in their respective fields, have contributed chapters on their specialties.

The subject matter of some of these chapters measures the extent to which newer scientific developments impinge on our industry. Some of these are Electron Microscopy, X-Ray Diffraction, Electrical Testing, Infrared Specitroscopy, Statistical Quality Control, Vulcanization, and Aging of Vulcanized Elastomers.

The body of the volume is devoted to the processing and compounding of natural and synthetic rubbers. Rubber compounding is discussed both in general and for specific products such as tires, mechanical goods, sheeting, wire and cable, etc. It is only natural that emphasis should be placed on the materials sold by Vanderbilt, but this does not detract from the high quality and usefulness of the book. There are many useful reference tables.

As a measure of the change in the rubber industry in the ten years between editions, it is interesting to examine the new content and the change in emphasis on the older materials. There are new and substantial sections on Thiokol, silicone rubbers, fluorocarbon elastomers, Hypalon, and high styrene resins. We all know of the increase in the proportion of synthetic rubber consumed in this country. Much additional space has been devoted, therefore, to its compounding, with a corresponding reduction of space for natural rubber. The discussion of styrene rubber and its compounding has been doubled; for butyl rubber it has been increased about fourfold, and for the nitrile rubbers even more.

R. T. Vanderbilt Co., Inc. and its editorial staff are to be congratulated on producing such a worthwhile and useful volume for the industry.—*John T. Blake.*

•

Techniques of Plant Maintenance and Engineering—1958. Published by Clapp & Poliak, Inc., 341 Madison Avenue, New York 17, N. Y. 8¼ x 11¼ in. 212 pp. $10.00.

This volume, ninth in a series, reports the proceedings of the Plant Maintenance & Engineering Conference held in Chicago last January. Included are texts of 35 papers and discussions, and of 450 questions and answers, summaries of nine roundtable discussions, plus 42 relevant charts, tables and illustrations.

Most of the papers and discussions have general application to all industries, though some, including rubber, are given special attention. A roundtable discussion on maintenance of rubber plants under the leadership of Carl R. Toothaker, plant engineer for the Naugatuck Footwear Plant of U. S. Rubber Co., is reproduced in full. Analyzed are such factors as cost control, equipment maintenance, contractors and personnel management. Incidentally, a new addition to the roundtable discussions is one on maintenance of research and development laboratories.

Subjects covered, among others, are: "How We Analyzed Our Maintenance Management," "How to Save on Electric Power Bills," "Maintenance in Small Plants (Up to 50 Maintenance Employees)", "Maintenance in Little Plants (Up to 10 Maintenance Employees)," "Fundamentals of Preventive Maintenance," and "Setting and Maintaining Sanitation Objectives." Much of this is worthwhile reading for plant engineers and others when investments by companies in maintenance is estimated to have increased until it now averages $63,662 in plant and equipment per maintenance worker.

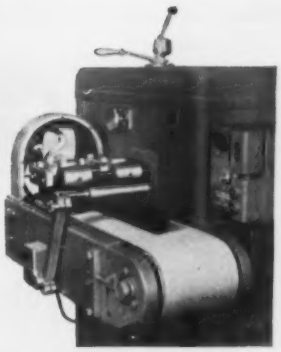
•

Die Praxis Des Gummichemikers (Das Laboratoriumsbuch Für Kautschuk, Kunstkautschuk und Weichgummiähnliche Kunststoffe). By Paul Kluckow. Published by Berliner Union, Stuttgart, Germany. 440 pp. DM 48 (About $11.50).

The author's aim was, as stated in the foreword, to present to the younger generation of rubber chemists the technological facts they need to know for practicing their profession. Addressing himself to the younger set of German chemists, the author wanted to write a text book providing the background and foundation for sound practice of rubber technology. This latter aim, the author states, appears to him most important in order to make up for the time lost in education during the political upheaval of the past years. The laboratory shelf rather than the study room of the scientist, the author points out, is meant to be the place for the book.

The author accomplished his aim to write the type of book as outlined in the foreword remarkably well. The table of contents (9 pages) shows the book to be well organized and to present the subject matter didactically. The book has three main sections. The first section (174 pages), devoted to raw materials, covers natural rubbers (various types of crude rubber, guttapercha and balata, chlorinated rubbers, cyclized rubber, etc.); synthetic rubbers (butadiene polymers and copolymers, butyl rubber, neoprene and polysulfides); compounding ingredients (pigments, reclaim, factice, plasticizers, coloring agents and vulcanizing ingredients); processing (mixing, vulcanizing, latex compounding). The second section (173 pages) of the book is devoted to the testing of compounding ingredients and compounds. The third section (31 pages) with the heading 'Weichgummiähnliche Kunststoffe' deals with rubber-like and other plastics of interest to rubber chemists. An appendix (3 pages) gives the chemical composition of modern accelerators.

The book is well written and contains a lot of valuable information. The historical review of the development of the rubber industry and of synthetic rubber in particular, which is presented from the German point of view, will make interesting reading for rubber chemists in this country. It is not a one-sided presentation. American literature and accomplishments are considered and frequently quoted. Kluckow's book represents a valuable addition to the literature of rubber and is highly recommended. —*F.R.*



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BOOKLETS, CATALOGS, etc.

Fact Book for Selecting Quad Ring Seals and O-Rings. Minnesota Rubber Co., 3630 Wooddale Ave., Minneapolis 16, Minn. 8½ x 11 in. 16 pp.

This useful fact book provides much information on O-rings, giving such data as the size numbers and dimensions of all common industrial O-rings as well as the Quad Ring produced by Minnesota Rubber. The sizes are cross-indexed for easy comparison with many of the most widely used dimensional specifications. Reference tables covering Aeronautical Material Specifications, SAE-ASTM Material Specifications, Mil-R-5847C Specifications and U. L. approved rubber compounds are provided. Also included is information on media in which various rubber compounds can be used. The design and applications of the Minnesota Quad Ring are explained with the aid of schematic diagrams.

•

Selection Guide to Silicone Insulating Components. Dow Corning Corp., Midland, Mich. 8½ x 11 in. 6 pp.

This bulletin is devoted to Dow Corning silicone products used to insulate electrical equipment. Information is given on component parts of equipment which need insulation; insulating material suitable for each part for 22, 180 and 155°C. use; and choices of materials for the parts themselves. Advantages of using silicone insulating materials are described, and the characteristics of Dow Corning 997 dipping and impregnating varnish are detailed. So-called plus factors in electrical equipment attained by using silicone materials—more overload capacity, longer insulation life, protection against moisture, dirt, weathering and corrosion—are also discussed.

•

Revertex Concentrated Rubber Latex. Revertex, Ltd., 51-55 Strand, London, W.C. 2, England. 8 x 10 in. 30 pp.

The subject of this attractive publication is Revertex, trade name for concentrated stabilized natural rubber latex. Three main types are described: Standard Revertex, which is concentrated to about 73 per cent and stabilized with potassium hydroxide and soap; T-Revertex, which is concentrated by evaporation to about 62 per cent and stabilized with ammonia, and R-Revertex, a pre-vulcanized latex concentrated by centrifuging to about 61 per cent and stabilized with ammonia. Properties and uses are detailed at length. The booklet closes with a two-page comparison of Revertex and synthetic latices.

•

Chemical Process Equipment. (Bulletin No. 16). Patterson Kelley Co., Inc., East Stroudsburg, Penna. 8½ x 11 in. 16 pp.

This bulletin contains product description and specifications of the company's complete line of blenders, vacuum tumble dryers, packaged resin-distillation pilot plants, and process heat exchangers. Also described are the organization and operation of a pre-test laboratory which, in testing customer formulations, helps determine proper blending equipment and correct blending procedures. Tables and schematic diagrams are used in presenting the data on dimensions and capacities.

•

Vinyl-Nitrile Rubber Study. Kenrich Corp., 57-02 48th St., Maspeth 78, N. Y. 8½ x 11 in. 8 pp.

This technical bulletin presents the results of a study on using Kenflex A resin with vinyl resin in nitrile rubber. Eight compounds with varying formulations were tested. Results indicate a definite improvement in ozone resistance. Physical properties (tensile, elongation, hardness) are also reported, also with indications of improvements.

Igepon Surfactants. Antara Chemicals Division, General Aniline & Film Corp., 435 Hudson St., New York 14, N. Y. 8½ x 11 in. 16 pp.

This booklet presents data on the properties and uses of the Igepon series of anionic surfactants. The chemical derivation of Igepon and the chemical formula, functional properties and uses of each of the brands is given. Igepon T is recommended for use in the rubber industry for emulsion stabilization, freeze-thaw stabilization and as a mold lubricant. Storage, weight and shipping information is also included. Graphs show comparative data on the surface and interfacial tension of the products. The booklet closes with a list of 30 literature references and a subject index.

•

Cowles Rotary Knives and Special Tools. (Bulletin No. 571). Cowles Tool Co., 2086 West 110th Street, Cleveland 2, Ohio. 8½ x 11¼ in. 48 pp.

This comprehensive publication describes and illustrates many industrial cutting tools, of which a number pertain directly to the rubber industry. Included in a special section devoted to rubber are data on rotary, circular, skiving, bias cutter, slitting, calender and debeading knives. Photographs show power-cutting installations. The history and services of the company are also discussed. Tables on steel hardness and chemical composition, and on measurement conversion close the booklet.

•

Heat Seal Characteristics of Polyethylene Films. U. S. Industrial Chemicals Co., 99 Park Ave., New York 1, N. Y. 8½ x 11 in. 16 pp.

The first half of this booklet discusses prime conditions, such as time, temperature, and time and temperature ranges, within which satisfactory heat seals can be made. The effects of such resin characteristics as melt index, slip agents and resin density are explained and illustrated, as well as the effects of film gauge and bag gussets. The last half of the report is devoted to a series of graphs showing the heat seal characteristics of various resins in the company's Petrothene polyethylene resin series.

•

Factors to Consider in the Selection and Application of Automatic Transfer Switches. Automatic Switch Co., Florham Park, N. J. 8½ x 11 in. 24 pp.

How to select an automatic transfer switch, and how it can be applied to industrial operations, are discussed in this bulletin. Such requirements as inrush capacity, continuous duty rating, rapid transferral of load, high thermal capacity and ability to withstand electromagnetic effects, double source control, full phase protection, and various structural and operational features are covered. Several commercial installations where switches are being used to advantage are also described.

•

Link-Belt Ball Bearing Trolleys. (Book No. 2636). Link Belt Co., Prudential Plaza, Chicago 1, Ill. 8½ x 11 in. 20 pp.

Ball bearing trolleys and how they work in maintaining the efficiency of trolley conveyors are described in detail in this booklet, which contains specific data on types and sizes of trolleys available, selection of new trolleys and attachments, and replacement of units in existing installations. Application and maintenance information is given and also included are data on trolley wheels, rollers for roller turns and special types of trolleys available for electrified and heavy duty use.

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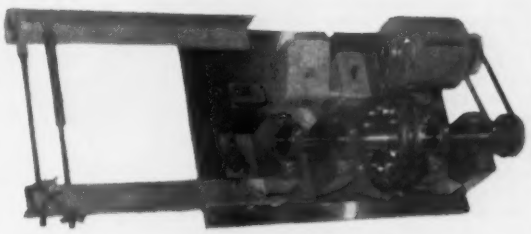

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TRENDS
NEWS
PRICES

Natural Rubber

Since our last report (October 1), the price of spot rubber on the New York Commodity Exchange has moved in a range of 188 points, high for the period being 31.88c reached on October 20, and low being 30.00c reached on October 1. The average price of spot rubber for the month of October was 31.06c based on 22 trading days. This compares with an average of 29.49c in the previous month.

Analysts at Merrill Lynch, Pierce, Fenner & Smith point out that world data reveal part of the motivation for the 1958 price uptrend. The essential item in world figures is that world consumption of natural rubber during January-August, 1958, was fully 102,000 long tons in excess of production.

What Saved Natural?

The saving grace for natural rubber included two factors: (1) Increased imports by Communist bloc countries, and (2) reduced production of natural.

The future looks basically bright because world production of natural has demonstrated every evidence of capability to move only slightly higher (only if prices attract) over the next two or three years.

In addition, world consumption seems bound to increase appreciably. The battleground for natural rubber is conspicuously clear. It is in Europe where new synthetic capacity is making its appearance. If prices for natural climb above 35c, the way would be open for further losses to synthetic rubber.

Natural rubber, even during the automobile recession in the United States, managed to do two things: its price did not fall below comparable types of synthetic, and it kept about 35 per cent of total consumption.

MLPFS seems to feel that the major question for new rubber in the year to come will be in consumption rather than in supply. The issue will be concentrated in the United States. Specifically, it seems to resolve upon the factor of consumer confidence.

The tire outlook is favorable. Together, vehicles and tires account for approximately 75 per cent of the physical volume of natural and synthetic used.

Natural Prospects Good

In general, the prospects for the highs in rubber consumption in 1959 are excellent. While production of natural rubber remains stable, all which can be produced will be consumed. Indications are that 1959 will be as good a year for the natural rubber industry as 1955 with prices holding firm at or near present levels.

Much will now depend on activities in the automotive industry and the next few months should indicate the manner in which the "wind will blow".

NEW YORK, NOVEMBER 3, 1958

Price Data

Closing Rubber Prices on New York Commodity Exchange

FROM OCT. 1 TO OCT. 31

Oct.	Spot	Nov.	Jan.	Mar.	Sales
1	30.00	29.82	29.65	29.50	17
2	30.25	30.00	29.85	29.70	25
3	30.50	30.40	30.10	29.90	28
4	....	....	....	....	..
5	....	....	....	....	..
6	30.38	30.23	29.98	29.95	21
7	30.13	29.95	29.70	29.65	48
8	30.38	30.20	30.00	30.00	56
9	30.50	30.35	30.10	30.10	43
10	30.63	30.60	30.35	30.25	65
11	....	....	....	....	..
12	....	....	....	....	..
13	....	....	....	....	..
14	31.38	31.15	31.05	30.90	82
15	31.38	31.30	30.95	30.90	99
16	31.38	31.20	30.90	30.85	26
17	31.38	31.35	31.05	31.02	27
18	....	....	....	....	..
19	....	....	....	....	..
20	31.88	31.75	31.60	31.50	66
21	32.00	31.75	31.55	31.50	55
22	31.63	31.36	31.05	31.05	70
23	31.38	31.25	31.00	30.90	62
24	31.38	31.25	31.00	30.85	56
25	....	....	....	....	..
26	....	....	....	....	..
27	30.88	30.60	30.55	30.50	55
28	31.25	31.10	30.94	30.94	40
29	31.50	31.25	31.15	31.15	29
30	31.63	31.45	31.25	31.20	45
31	31.50	31.35	31.05	31.05	20

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.31½
Dec.	.31¼
Jan.-Mar.	.31¼
Thin Latex Crepe:	
Spot	.34¼
Thin Brown Crepe, No. 2	.26¾
Flat Bark Crepe	.22⅜

London Market
(Standard Smoked Sheets)

Dec.	29.96 — 30.26
Jan.-Mar.	30.40 — 30.55

Singapore Market
(Standard Smoked Sheets)

Dec.	29.36 — 29.45

Middling Upland Quotations

	Oct. 1	October 31		
	Close	High	Low	Close
Dec.	36.22	36.27	36.21	36.27
Mar.	36.66	36.71	36.65	36.70
May	36.44	36.58	36.48	36.51

Notes & Quotes

Strong forces are working both for and against automation in American industry according to James E. Trainer, executive vice-president of the Firestone Tire & Rubber Co. The forces working against automation include cost of capital investments; lack of trained personnel, and the present boundaries of technical knowledge. Working for automation is the need for this country to stay out in front in the race for technological and scientific supremacy. Another factor is increasing population and the need for expanded production to meet growing wants.

Synthetic Rubber

Synthetic rubber will be available to supply a large share of the world's total new rubber needs within three years, according to J. Ward Keener, president and chief executive officer of the B. F. Goodrich Co. A world-wide trend toward synthetic rubber backs Mr. Keener's prediction.

"High quality of man-made rubbers and their price stability are the major reasons," he said. "Synthetic rubber at 23 cents a pound is attracting manufacturers faced with wide price fluctuations of the tree-grown variety. In the four-year period since 1954, the price of natural rubber has ranged from 19½ cents a pound to a high of 52 cents."

Mr. Keener points out that world consumption of new synthetic rubber in 1958, outside Soviet countries, will total nearly a million and a quarter tons—more than double the figure 10 years ago, when usage was largely limited to the U.S.A. and Canada, and 40 per cent more than was used just five years ago.

Trend Toward Synthetic

"The trend toward synthetic has accompanied the expanding demand for rubber products throughout the world," he said. "This year, synthetic rubber will supply about 64½ per cent of the total new rubber requirements in the United States. This is an all-time high percentage except for years of wartime controls. The other Free World nations will consume about 360,000 long tons of synthetic rubber, or 25½ per cent of their total new rubber needs.

"A further relative decline in the use of natural rubber seems certain from now on in virtually every major consuming country as long as the price of natural rubber is not competitive with synthetic."

Next year, U. S. consumption of synthetic rubber will about double that of natural rubber, Mr. Keener said, and will be nearly one million long tons. In the rest of the Free World, synthetic consumption will be up more than 15 per cent over 1958 to account for practically all of the gain in new rubber consumption abroad.

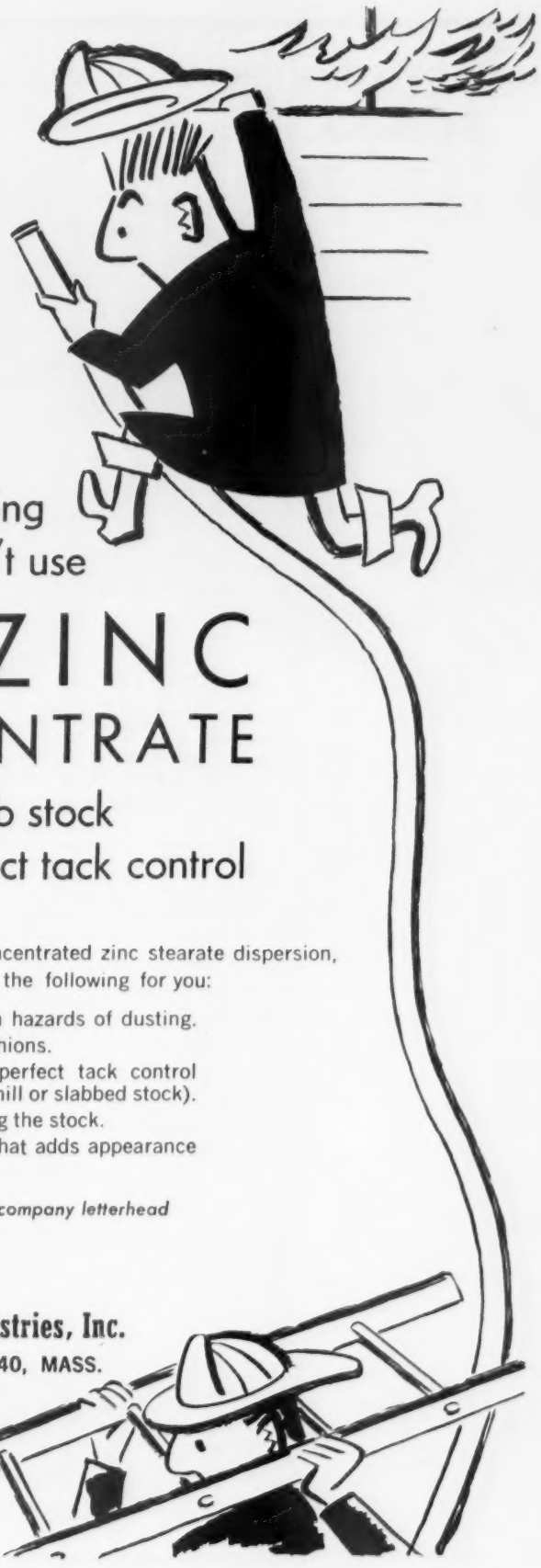
Ever Increasing Demand

To meet the everincreasing demand, new overseas synthetic plants are being added, raising annual capacity throughout the Free Nations to nearly two million tons. This compares with a probable world need for total new rubber in 1959 of about 3,300,000 tons.

Four new synthetic rubber plants in Western Europe, with a combined capacity of 195,000 tons, have begun production within the past few months. These are located at Fawley, England; Marl, Germany; Ravenna, Italy; and Port Jerome, France. Further new plants are being planned for Brazil and Japan.

something missing?

is something missing in your plant, too?



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2. Eliminates the need for liners or cushions.
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4. It's readily absorbed without affecting the stock.
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PRICES OF COMMERCIALLY AVAILABLE SYNTHETIC RUBBER

Dry Rubber

(per pound carload)

Butadiene-Acrylonitrile Types

Butaprene NF	.4900 [1]
Butaprene NH	.6500 [1]
Butaprene NL	.5000 [1]
Butaprene NXM	.5800 [1]
Chemigum N1	.6400 [3]
Chemigum N3	.5800 [2]
Chemigum N5	.5800 [3]
Chemigum N6	.5000 [3]
Chemigum N6B	.5000 [3]
Chemigum N7	.5000 [3]
Chemigum N8	.5000 [3]
Herecol N-33	.6800 [3]
Hycar 1001	.5800 [4]
Hycar 1002	.5000 [3]
Hycar 1014	.6000 [3]
Hycar 1041	.5800 [3]
Hycar 1042 and 1043	.5000 [3]
Hycar 1312	.5000 [3]
Hycar 1411	.6200 [3]
Hycar 1432	.5900 [3]
Hycar 1441	.6200 [3]
Paracril AJ	.4850 [2]
Paracril ALT	.5000 [2]
Paracril B and BJ	.5000 [2]
Paracril BLT and BJLT	.5000 [2]
Paracril C and CLT	.5800 [2]
Paracril CV	.5900 [2]
Paracril D	.6500 [2]
Paracril 18-80	.6000 [2]
Paracril OZO	.4600 [2]
Polysar Krynac 800	.5000 [3]
Polysar Krynac 801	.5800 [3]
Polysar Krynac 802	.5000 [3]
Polysar Krynac 803	.5000 [3]

Butadiene-Styrene Types

Ameripol 1000	.2410 [3]
Ameripol 1001	.2410 [3]
Ameripol 1002	.2435 [3]
Ameripol 1006	.2410 [3]
Ameripol 1006 (crumb)	.2475 [3]
Ameripol 1007	.2410 [3]
Ameripol 1009	.2475 [3]
Ameripol 1011	.2550 [3]
Ameripol 1012	.2425 [3]
Ameripol 1012 (crumb)	.2540 [3]
Ameripol 1013	.2500 [3]
Ameripol 1500	.2410 [3]
Ameripol 1501	.2410 [3]
Ameripol 1502	.2410 [3]
Ameripol 1703	.2060 [3]
Ameripol 1705	.2035 [3]
Ameripol 1707	.1910 [3]
Ameripol 1708	.1910 [3]
Ameripol 1710	.1885 [3]
Ameripol 1712	.1885 [3]
Ameripol 4700	.1750 [2]
Ameripol 4701	.1725 [2]
ASRC 1000	.2410 [3]
ASRC 1001	.2401 [3]
ASRC 1004	.2401 [3]
ASRC 1006	.2410 [3]
ASRC 1009	.2475 [3]
ASRC 1018	.2700 [3]
ASRC 1019	.2650 [3]
ASRC 1500	.2410 [3]
ASRC 1502	.2410 [3]
ASRC 1503	.2625 [3]
ASRC 1703	.2060 [3]
ASRC 1708	.1910 [3]
ASCR 3110	.2600 [3]
Baytown 1600	.1760 [2]
Baytown 1601	.1760 [2]
Baytown 1602	.1760 [2]
Baytown 1801	.1600 [2]
Carbomix 3750	.1820 [3]
Carbomix 3751	.1545 [3]
Carbomix 3752	.1870 [3]
Carbomix 3753	.1640 [3]
Carbomix 3754	.1790 [3]
Carbomix 3755	.1535 [3]
Copo 1500	.2410 [3]
Copo 1502	.2410 [3]
Copo 1505	.2610 [3]
Copo 1712	.1885 [3]
Copo 1773	.2060 [3]
Copo 1778	.1910 [3]
Copo 3900	.2310 [3]
FR-S 1000	.2410 [3]
FR-S 1001	.2410 [3]
FR-S 1004	.2410 [3]
FR-S 1006	.2410 [3]
FR-S 1009	.2475 [3]
FR-S 1010	.2600 [3]
FR-S 1012	.2425 [3]
FR-S 1013	.2500 [3]
FR-S 1014	.2810 [3]
FR-S 1015	.2910 [3]
FR-S 1500	.2410 [3]
FR-S 1502	.2410 [3]
FR-S 1703	.2060 [3]
FR-S 1705	.2035 [3]
FR-S 1712	.1885 [3]
Naugapol 1016	.2650 [3]
Naugapol 1018	.2700 [3]
Naugapol 1019	.2650 [3]
Naugapol 1021	.3000 [3]
Naugapol 1022	.2800 [3]
Naugapol 1023	.2850 [3]
Naugapol 1503	.2625 [3]
Naugapol 1504	.2950 [3]
Philprene 1000	.2410 [3]
Philprene 1001	.2410 [3]
Philprene 1006	.2410 [3]
Philprene 1009	.2475 [3]
Philprene 1010	.2600 [3]
Philprene 1018	.2700 [3]
Philprene 1019	.2650 [3]
Philprene 1100	.1940 [3]
Philprene 1104	.1900 [3]
Philprene 1500	.2410 [3]
Philprene 1502	.2410 [3]
Philprene 1503	.2625 [3]
Philprene 1600	.1930 [3]
Philprene 1601	.1930 [3]
Philprene 1605	.1900 [3]
Philprene 1703	.2060 [3]
Philprene 1706	.2030 [3]
Philprene 1708	.1910 [3]
Philprene 1712	.1885 [3]
Philprene 1803	.1740 [3]
Plioflex 1006	.2410 [3]
Plioflex 1500	.2410 [3]
Plioflex 1502	.2410 [3]
Plioflex 1703	.2060 [3]
Plioflex 1710	.1885 [3]
Plioflex 1712	.1885 [3]
Plioflex 1773	.2060 [3]
Plioflex 1778	.1910 [3]
Polysar Kryflex 200	.2510 [3]
Polysar Krylene	.2410 [3]
Polysar Krylene NS	.2410 [3]
Polysar Krynol 651	.1885 [3]
Polysar Krynol 652	.1910 [3]
Polysar S	.2410 [3]
Polysar S-50	.2410 [3]
Polysar S-X 371	.2550 [3]
Polysar SS-250	.2875 [3]
S-1000	.2300 [2]
S-1002	.2325 [2]
S-1006	.2300 [2]
S-1009	.2400 [2]
S-1011	.2325 [2]
S-1013	.2300 [2]
S-1100	.1850 [2]
S-1500	.2300 [2]
S-1502	.2300 [2]
S-1506	.2500 [2]
S-1600	.1825 [2]
S-1602	.1825 [2]
S-1703	.1950 [2]
S-1706	.1925 [2]
S-1707	.1800 [2]
S-1709	.1775 [2]
S-1712	.1775 [2]
S-1803	.1650 [2]
S-1804	.1750 [2]
Synpol 1000	.2410 [3]
Synpol 1001	.2410 [3]
Synpol 1002	.2435 [3]
Synpol 1006	.2410 [3]
Synpol 1007	.2410 [3]
Synpol 1009	.2475 [3]
Synpol 1012	.2425 [3]
Synpol 1013	.2500 [3]
Synpol 1061	.2410 [3]
Synpol 1500	.2410 [3]
Synpol 1502	.2410 [3]
Synpol 1551	.2410 [3]
Synpol 1703	.2060 [3]
Synpol 1707	.1910 [3]
Synpol 1708	.1910 [3]
Synpol 1711	.1900 [3]
Synpol 1712	.1885 [3]

Butyl Rubbers

Enjay Butyl 035 and 150	.2300 [3]
Enjay Butyl 165 NS	.2400 [3]
Enjay Butyl 215	.2300 [3]
Enjay Butyl 217	.2300 [3]
Enjay Butyl 218	.2300 [3]
Enjay Butyl 268 NS	.2400 [3]
Enjay Butyl 325	.2300 [3]
Enjay Butyl 365 NS	.2400 [3]
Polysar Butyl 100	.2450 [3]
Polysar Butyl 101	.2775 [3]
Polysar Butyl 200 and 300	.2450 [3]
Polysar Butyl 301	.2550 [3]
Polysar Butyl 400	.2450 [3]

Chlorosulfonated Polyethylene

Hypalon 20	.7000 [3]
Hypalon 30	.7000 [3]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [3]
Neoprene Type AD	.5500 [2]
Neoprene Type FB	.6500 [2]
Neoprene Type GN	.4100 [3]
Neoprene Type GN-A	.4100 [3]
Neoprene Type GRT	.4200 [3]
Neoprene Type KNR	.7500 [3]
Neoprene Type S	.4200 [3]
Neoprene Type W	.3900 [3]
Neoprene Type WB	.4100 [2]
Neoprene Type WHV	.3900 [3]
Neoprene Type WRT	.4500 [3]
Neoprene Type WX	.4100 [3]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.5000 [2]
Thiokol Type FA	.6900 [2]
Thiokol Type ST	1.2500 [2]

Silicone Rubbers*

	(prices l.c.l.)
GE (compounded)	2.50 [3]
GE Silicone Gum (not compounded)	4.00 [3]
Silastic (compounded)	1.90 [3]
Silastic (gums)	3.85 [3]
Union Carbide (gums)	4.00 [3]
Union Carbide (compounds)	2.30 [3]

Latex

(per pound carload)

Butadiene-Acrylonitrile Types

Butaprene N-300	.4600 [1]
Butaprene N-400	.5400 [1]
Butaprene N-401	.5400 [1]
Chemigum 200	.4900 [3]
Chemigum 235	.5400 [3]
Chemigum 236	.5400 [3]
Chemigum 245	.4600 [3]
Chemigum 246	.4600 [3]
Chemigum 247	.4600 [3]
Chemigum 248	.4600 [3]
Hycar 1512	.4600 [3]
Hycar 1551	.5400 [3]
Hycar 1552	.4600 [3]
Hycar 1561	.5400 [3]
Hycar 1562	.4600 [3]
Hycar 1571	.5400 [3]
Hycar 1572	.5100 [3]
Hycar 1577	.4600 [3]
Hycar 1852	.4600 [3]
Nitrex 2612	.4600 [1]
Nitrex 2614	.4600 [1]
Nitrex 2614-A	.4600 [1]
Nitrex 2615	.5100 [1]
Nitrex 2615-A	.5100 [1]
Nitrex 2616	.5400 [1]
Nitrex 2617	.4600 [1]
Nitrex 2617-A	.4600 [1]
Nitrex 2619	.5300 [1]
Nitrex 2620	.4600 [1]
Nitrex 2625	.4600 [1]

Butadiene-Styrene Types

Copo 2101	.3000 [3]
Copo 2102	.3200 [3]
Copo 2105	.3200 [3]
Copo 2108	.3375 [3]
Copo 2110	.3200 [3]
Copo X-800	.2775 [3]
FR-S 2000	.2775 [3]
FR-S 2001	.2775 [3]
FR-S 2002	.3000 [3]
FR-S 2003	.3050 [3]

POLYMERS

FR-S 2004	.3050 [3]
FR-S 2006	.2900 [3]
FR-S 2105	.3200 [3]
Naugatex 2000	.2775 [1]
Naugatex 2001	.2775 [1]
Naugatex 2002	.3000 [1]
Naugatex 2006	.2900 [1]
Naugatex 2105	.3200 [1]
Naugatex 2107	.3200 [1]
Naugatex 2108	.3000 [1]
Pliolite 2000	.2775 [3]
Pliolite 2001	.2775 [3]
Pliolite 2076	.2900 [3]
Pliolite 2104	.3200 [3]
Pliolite 2105	.3200 [3]
Pliolite 2107	.3200 [3]
Pliolite 2108	.3000 [3]
S-2000	.2275 [3]
S-2006	.2150 [3]
S-2101	.2250 [3]
S-2105	.3100 [3]
S-2107	.3200 [3]

Neoprene

Neoprene Latex 60	.4000 [2]
Neoprene Latex 571	.3700 [2]
Neoprene Latex 572	.3900 [2]
Neoprene Latex 601-A	.4000 [2]
Neoprene Latex 673	.5000 [2]
Neoprene Latex 735	.3800 [2]
Neoprene Latex 736	.3800 [2]
Neoprene Latex 842-A	.3700 [2]
Neoprene Latex 950	.4700 [2]

Polysulfide Rubbers

Thiokol Type MX	.8000 [2]
Thiokol Type WD-2	1.2500 [2]
Thiokol Type WD-6	.8000 [2]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid. *Covers a wide range of compounds. Readers are urged to check specific prices with producers.

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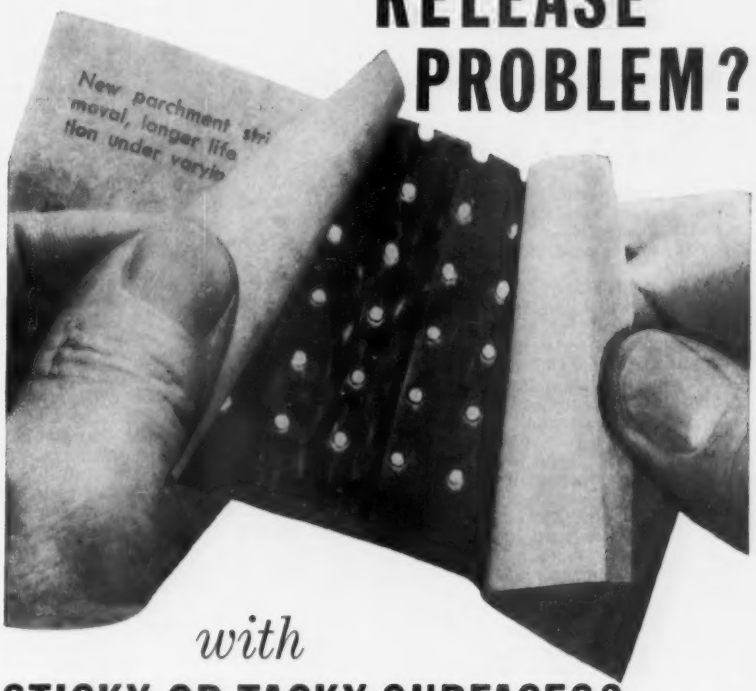

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HEADQUARTERS FOR VEGETABLE PARCHMENT SINCE 1885

MARKETS

(continued)

Reclaimed Rubber

The trade reports that reclaimed rubber business is on the upswing. How stable this increase remains depends largely on the production of 1959 automobiles.

The Rubber Manufacturers Association reports that in the first nine months of the current year a total of 186,063 long tons of reclaimed rubber were produced in the United States. In the first nine months of last year, 204,767 long tons were produced.

As for consumption, in the first nine months of this year, 179,715 long tons of reclaimed rubber were used while in the similar period of the preceding year, 203,200 long tons were used.

RMA reports that as of September 30, 1958, there were 26,911 long tons of reclaimed rubber on hand. At the end of September, 1957, there were 25,983 long tons of reclaim in stocks.

Heightened activity by automobile manufacturers in the remainder of this year may bring total reclaim consumption to about 250,000 long tons.

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.11½
First Line Whole Tire	.11
Second Line Whole Tire	.10½
Third Line Whole Tire	.10¼
Fourth Line Whole Tire	.09¾
Black Carcass	.15¼
No. 1 Light Colored Carcass	.22
No. 1 Peel	.11
Butyl Tub Reclaim	.14
Natural Rubber Black Tube	.16
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

Fair activity has been reported in the scrap rubber market during the past few weeks with material moving a bit more freely to reclaimers. In the scrap tube section, black passenger and butyl tubes are reported to be a bit firmer.

If the trend continues throughout the balance of the year, the possibility exists that total scrap consumption by year-end will total 220,000 to 230,000 long tons. Through the first nine months of this year, the Rubber Manufacturers Association reports, scrap consumption totaled 162,047 long tons. Stocks on hand as of September 30, 1958, totaled 55,201 long tons.

(Prices Delivered Akron)

Mixed tires	ton	14.00
Light colored carcass	lb.	.04¼
No. 1 peelings	ton	28.00
No. 2 peelings	ton	25.00
No. 3 peelings	ton	18.00
Buffings	ton	16.00
Truck and Bus S.A.G.	ton	19.00
Passenger S.A.G.	ton	17.00
Natural Rubber Red Tubes	lb.	.07½
Natural Rubber Black Tubes	lb.	.06¾
Butyl Rubber Tubes	lb.	.04½

Tire Fabrics

According to E. I. du Pont de Nemours & Co., Inc., use of nylon tire cord and fabric in the first half of this year showed an increase of 8.2 per cent over the first half of 1957. Use of rayon tire cord and fabric for the same period was off 29.6 per cent.

In the first half of 1957, nylon tire cord and fabric usage amounted to 38,966,000 pounds, growing to 42,166,000 pounds in the first half of 1958, an increase of 8.2 per cent.

Use of rayon tire cord and fabric in the first half of 1957 totaled 165,115,000 pounds, but dropped off to 116,115,000 pounds for the first half of 1958, a decline of 29.6 per cent.

Trend to Nylon Cord

The trend toward nylon cord is further highlighted when differences in weight of nylon and rayon cord in the same size tire are taken into consideration, declares DuPont. Nylon yarn is stronger than rayon yarn, so less is required per tire, and one pound of nylon actually replaces approximately 1.7 pounds of rayon in tire manufacture.

When tire cord consumption figures are viewed with this relationship in mind, an even greater penetration of the market is evident. At a ratio of one pound of nylon to 1.7 pounds of rayon cord, nylon actually amounts to 38 per cent of the total tire cord used during the first half of 1958, DuPont declares. This factor increased from 33 per cent in the last half of 1957, and from 29 per cent in the first six months of 1957.

Nylon Cord Tire Sales

The increase in nylon consumption and the decline in rayon revealed by these figures check with reported substantial increases in nylon cord tire sales, with nylon currently representing approximately 50 per cent of total replacement tire sales. Nylon yarn is being used in virtually all premium passenger replacement tires, heavy duty truck replacement tires, off-the-road tires, and aircraft tires, DuPont states.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.73
1650	lb.	.67
2200	lb.	.67½

Nylon Tire Cord

210	lb.	1.95
840	lb.	1.70

Rayon Graded Fabric

1100	lb.	.69
1650	lb.	.63½
2200	lb.	.63

Cotton Chafers

8.9 oz. (per square yard)	lb.	.68
9.25 oz. (per square yard)	lb.	.66
11.65 oz. (per square yard)	lb.	.62
14.4 oz. (per square yard)	lb.	.71

Liquid Latex

Natural: Natural rubber latex is now selling at a 38 to 39c per pound level at East Coast ports in car load quantities and the possibility exists that at these levels some degree of consumer resistance may develop.

On the basis of consumption figures available for the first nine months of this year, it would appear as if some 5,500 long tons of natural rubber latex are being consumed each month on an average.

At this consumption rate, total usage in 1958 may approach a 65,000 long ton level. This figure, while far below the 1957 total of 75,009 long tons, is still higher than expected by many earlier in the year.

The Rubber Manufacturers Association reports that in the first nine months of this year, 48,535 long tons of natural rubber latex were imported into the United States. In the first nine months of the preceding year, 54,666 long tons were imported.

As of September 30, 1958, there were 12,193 long tons of natural rubber latex on hand. On September 30, 1957, there were 12,315 long tons on hand.

Synthetic: Department of Commerce figures show that in the first eight months of this year a total of 35,068 long tons of S-type latex were consumed; 6,292 long tons of neoprene latex; 6,448 long tons of N-type for a total of 47,808 long tons.

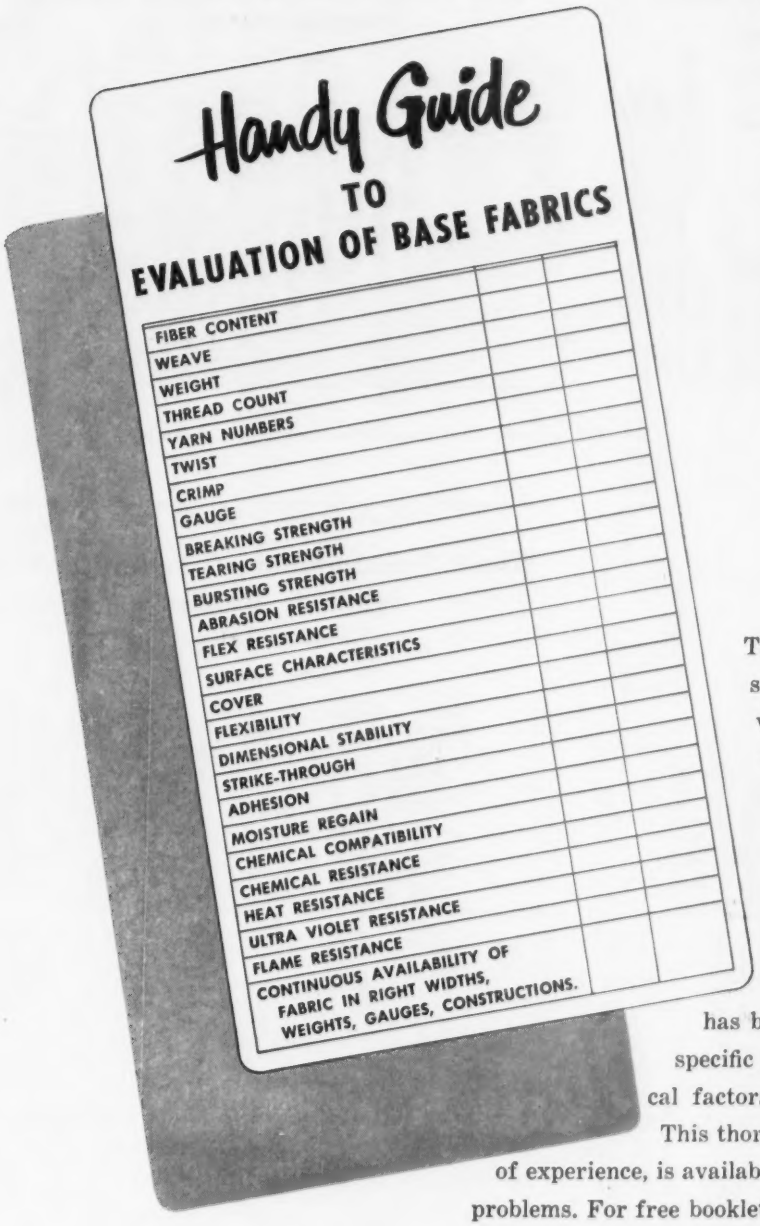
At this consumption rate, a total of 72,000 long tons of all types of synthetic latex will be consumed in 1958 compared with the 85,974 long tons consumed in the previous year.

Cotton

The price of middling uplands on the New York Commodity Exchange has moved in the extremely narrow range of 20 points since our last report (October 1), high for the period being 36.30c reach on October 29, 30 and 31, and low being 36.10c reached on October 1. The average price of middling uplands for the month of October was 36.23c based on 22 trading days. This compares with an average of 36.00c in September.

The cotton market has been steady during the past period recording modest gains. There has been a lack of important hedge selling and there are indications that a large percentage of ginnings are being held off the market or being placed in government stocks.

The Department of Agriculture has announced that carrying charges on government owned cotton sold for export will be eliminated. While this may cheapen American cotton, the reaction in the trade is that it will not improve the situation materially since cotton is selling abroad at 10c under American cotton. The possibility exists that another surplus crisis may come about in the next year.



This fictitious "guide" has been created solely to show some of the factors which often have to be considered in the selection of a base fabric. They serve only to point up one fact: that there can be *no* such thing as a put-it-in-your-pocket guide in this field. But one thing is certain: when you're guided by Wellington Sears, you know that your base fabric has been considered in the light of your specific need, and that all significant technical factors have been thoroughly examined. This thoroughness, plus more than a century of experience, is available to help solve *your* working-fabric problems. For free booklet, "Fabrics Plus," write Dept. G-11.

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STATISTICS of the industry

PERTINENT INDUSTRY DATA

Natural Rubber in the United States

(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1931	501,788	355,200	25,609	322,000
1932	414,668	336,700	20,937	379,000
1933	418,902	412,400	20,576	365,000
1934	463,018	462,500	23,856	355,000
1935	467,146	495,500	11,391	303,000
1936	488,145	575,000	12,582	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	802,249	720,268	8,644	89,215
1951	733,048	454,015	2,603	76,569
1952	805,997	453,846	3,024	95,260
1953	647,150	553,473	8,376	112,316
1954	596,848	596,285	7,443	104,543
1955	635,174	634,800	10,611	110,105
1956	580,510	563,095	11,300	115,949
1957	479,121	539,761	10,146	100,901
1957:				
Sept.	44,188	43,675	780	103,233
Oct.	49,371	48,782	926	102,496
Nov.	44,583	43,696	1,225	97,754
Dec.	44,544	38,058	1,000	100,473
1958:				
Jan.	45,564	42,597	706	104,979
Feb.	52,546	36,711	903	110,880
Mar.	41,986	38,191	1,150	112,863
Apr.	31,511	36,608	1,395	107,897
May	29,237	36,014	1,707	100,985
June	28,279	37,607	1,634	91,779
July	27,521	34,235	3,107	85,577
Aug.	42,757	39,444	1,006	85,666
Sept.	38,321	45,059	850	85,328

Source: U. S. Department of Commerce.

U. S. Imports of Natural Rubber

Year	Dry: Long Tons	Dry: Declared Value	Latex: Long Tons	Latex: Declared Value	Total Imports
1936	467,064	152,072,496	19,852	6,659,899	486,916
1937	574,600	237,307,041	23,185	10,213,670	597,785
1938	397,640	125,373,864	11,944	4,168,127	409,584
1939	469,946	167,586,780	27,437	10,467,552	497,383
1940	781,202	303,308,823	33,789	14,593,466	814,991
1941	989,498	401,976,317	34,797	15,965,627	1,024,245
1942	266,276	112,537,426	10,646	5,630,667	276,922
1943	50,358	31,369,198	1,890	1,312,202	52,248
1944	103,847	73,908,549	3,091	2,092,211	106,938
1945	134,408	95,814,102	4,773	3,115,853	139,181
1946	376,502	228,796,110	8,421	5,843,085	384,923
1947	691,087	306,951,814	17,542	9,787,722	708,629
1948	702,293	290,849,177	32,745	18,288,223	735,038
1949	630,808	225,343,624	29,743	14,968,650	660,551
1950	747,109	416,222,598	54,401	41,764,486	801,510
1951	677,874	727,343,348	54,963	80,178,309	732,837
1952	756,987	578,179,519	48,228	40,563,116	805,215
1953	571,635	284,909,223	75,511	46,353,333	647,146
1954	522,364	219,098,143	74,483	42,755,029	596,847
1955	542,507	360,435,303	92,825	80,163,114	635,332
1956	499,479	334,990,045	71,709	61,795,844	564,321
1957	475,958	291,337,628	78,567	58,249,788	554,174
1957:					
Sept.	38,672	24,073,879	5,516	4,266,918	44,188
Oct.	41,020	25,996,607	8,351	6,120,335	49,020
Nov.	38,087	22,885,060	6,496	4,688,156	44,583
Dec.	46,350	26,243,338	7,572	5,141,999	53,922
1958:					
Jan.	39,275	20,938,606	6,290	4,210,554	45,565
Feb.	39,005	20,299,708	7,013	4,787,054	46,018
Mar.	32,740	16,891,665	7,147	4,736,971	39,887
Apr.	28,582	14,476,348	6,348	4,148,636	34,930
May	27,941	13,520,935	4,121	2,760,020	32,062
June	23,596	11,000,264	4,323	2,741,928	27,919

Source: Bureau of the Census. U. S. Department of Commerce.

World Production of Natural Rubber

(Including Latex)

(Long Tons)

Year	Malaya	Indonesia	Ceylon	Viet Nam & Cambodia	Latin America*	Rest of World*	Total*
1947	646,362	277,951	89,000	38,128	34,928	172,782	1,260,000
1948	698,189	432,349	95,000	43,935	29,158	225,557	1,525,000
1949	671,503	432,996	89,500	43,010	27,318	225,659	1,490,000
1950	694,090	696,472	113,500	48,482	26,902	280,299	1,860,000
1951	605,346	814,406	105,000	52,136	29,777	278,262	1,885,000
1952	584,238	750,494	96,500	63,134	35,475	261,211	1,790,000
1953	574,390	692,164	98,610	74,545	35,318	250,182	1,725,000
1954	584,435	738,670	93,935	78,024	26,833	280,112	1,802,500
1955	639,128	733,786	93,830	80,172	6,000	344,584	1,897,500
1956	568,550	686,667	95,389	89,072	22,457	336,015	1,857,000
1957	638,706	684,515	98,164	58,440	28,351	381,824	1,890,000
1958:							
Jan.	61,215	33,997	9,853	8,893	3,708	27,834	145,500
Feb.	51,633	28,717	6,585	1,927	2,566	28,542	120,000
Mar.	48,663	47,279	6,938	1,740	3,567	31,813	140,000
Apr.	44,962	40,775	9,763	5,628	2,405	26,467	130,000
May	45,398	37,779	8,516	5,324	500	29,983	127,500
June	53,105	45,731	5,646	5,526	500	31,992	142,500
July	60,376	66,099	8,263	....	500	37,262	172,500

Source: International Rubber Study Group. * Estimated.

World Consumption of Natural and Synthetic Rubber

(Including Latex)

(Long Tons)

Year	United States	United Kingdom	Canada	Europe*	Rest of World*	Total*
1946	1,039,296	126,770	39,196	145,000	115,804	1,467,500
1947	1,122,327	156,399	61,452	242,500	153,548	1,735,000
1948	1,069,404	196,286	62,121	392,000	182,379	1,902,500
1949	988,903	186,622	56,362	446,500	207,388	1,887,500
1950	1,258,557	222,425	68,695	448,500	287,055	2,285,000
1951	1,214,298	238,101	70,809	476,500	314,941	2,312,500
1952	1,261,413	202,179	67,099	550,000	254,901	2,335,000
1953	1,338,309	211,453	73,394	521,000	343,606	2,500,000
1954	1,233,012	247,612	71,656	544,250	408,094	2,505,000
1955	1,529,699	266,804	84,528	630,000	464,250	2,980,000
1956	1,436,482	232,345	91,458	775,500	489,215	3,025,000
1957	1,464,640	239,021	88,379	777,250	565,710	3,135,000
1958:						
Jan.	115,222	20,483	6,202	74,000	39,093	252,500
Feb.	100,941	21,293	5,979	78,500	40,787	247,500
Mar.	104,231	23,481	5,907	74,750	49,131	257,500
Apr.	103,221	18,071	6,439	82,500	52,269	262,500
May	102,318	20,165	6,836	73,750	41,931	245,000
June	107,413	22,023	7,701	.....	132,863	270,000
July	98,100	17,410	6,816	.....	102,174	242,500

Source: International Rubber Study Group. * Estimated.

Rim Production

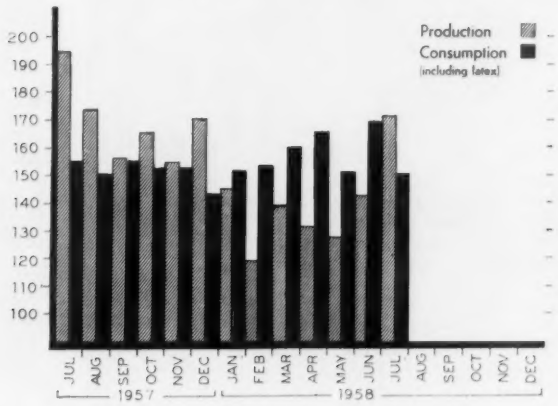
	1953	1954	1955	1956	1957
Passenger Car	31,318,461	25,952,322	38,092,080	27,109,610	27,301,567
Truck & Bus	5,228,831	4,463,689	6,642,329	6,315,428	5,468,223
Agricultural	1,943,489	1,279,040	1,931,768	1,416,938	1,368,127
Earth Mover	24,685	21,536	38,849	88,812	67,289
Total	38,514,954	31,734,587	46,705,036	34,930,788	34,205,206

	1958					
	Apr.	May	June	July	Aug.	Sept.
Passenger Car	1,711,921	1,438,950	1,431,337	1,306,266	999,623	1,466,800
Truck & Bus	302,314	320,070	318,248	318,952	214,813	325,764
Agricultural	105,495	66,787	65,173	76,525	61,286	61,021
Earth Mover	4,933	2,507	8,049	2,137	6,492	7,830
	2,124,663	1,828,269	1,822,807	1,703,880	1,282,214	1,861,415

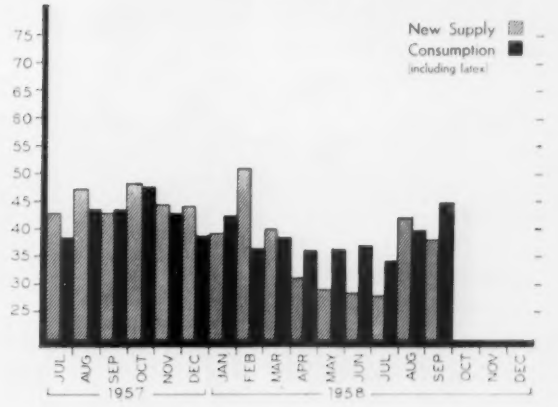
Source: The Tire & Rim Association, Inc.

STATISTICS at a glance

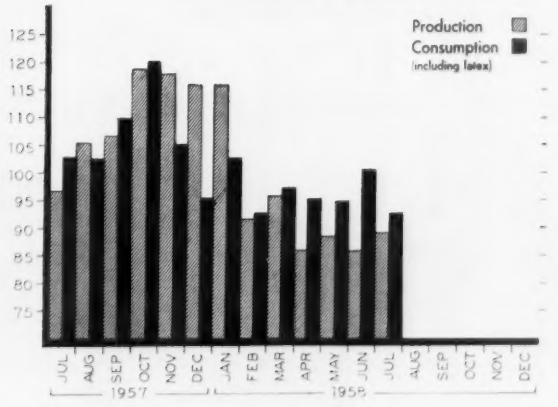
NATURAL RUBBER—WORLD
(thousands of long tons)



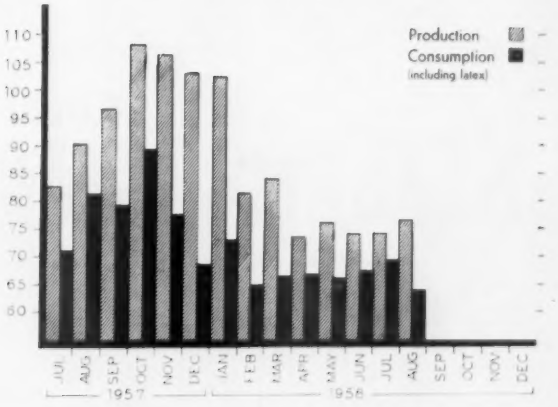
NATURAL RUBBER—UNITED STATES
(thousands of long tons)



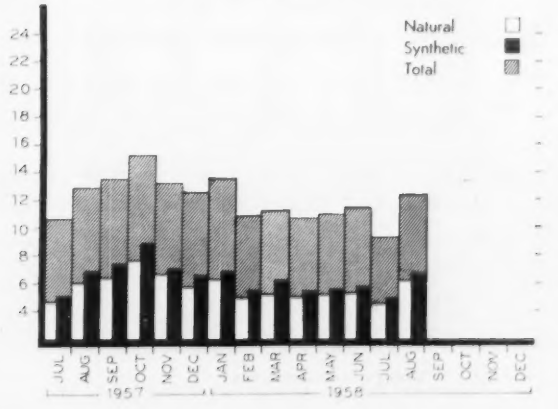
SYNTHETIC RUBBER—WORLD
(thousands of long tons)



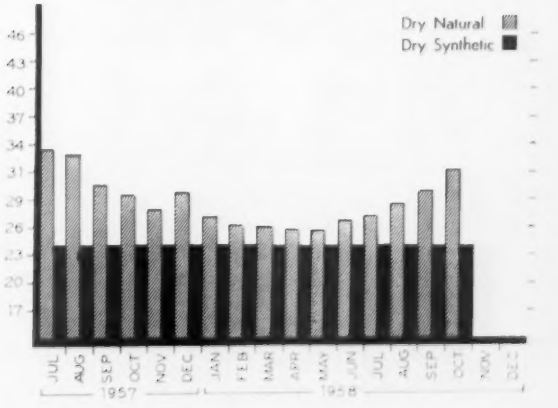
SYNTHETIC RUBBER—UNITED STATES
(thousands of long tons)



LATEX CONSUMPTION—UNITED STATES
(thousands of long tons)



PRICES—NATURAL AND SYNTHETIC
cents per pound



Synthetic Rubber in the United States

(All Quantities in Long Tons)

New Supply

Year	GR-S	Neoprene	Butyl	N-Type	Total
1949	**310,539**	**35,215**	**54,046**	**11,072**	**410,932**
1950	**378,887**	**50,067**	**60,915**	**12,037**	**501,906**
1951	**704,529**	**58,907**	**76,475**	**15,333**	**855,244**
1952	**654,854**	**65,745**	**81,630**	**16,228**	**818,447**
1953	**680,728**	**80,495**	**79,801**	**20,198**	**861,222**
1954	**490,405**	**69,150**	**58,802**	**21,396**	**639,753**
1955	801,145	91,357	56.179	32,623	982.304
1956	876,982	99,412	75,873	34.547	1,086.814
1957	913,321	110,721	67,418	33,618	1,125,078
1957:					
Dec.	85,624	9,568	6,469	2,519	104,180
1958:					
Jan.	85,828	8,804	6,189	2,419	103,240
Feb.	66,693	8,200	5,038	2,198	82,129
Mar.	69,650	7,671	4,808	2,082	84,211
Apr.	59,677	7,973	4,406	2,249	74,305
May	62,642	7,450	4,512	2,369	76,973
June	63,032	7,251	2,080	2,327	74,690
July	64,944	6,248	3,698	2,193	77,083
Aug.	73,338	6,745	4,455	2,783	87,321

Consumption

1950	**416,230**	**43,781**	**66,348**	**11,930**	**538,289**
1951	**626,444**	**48,887**	**70,500**	**13,066**	**758,897**
1952	**666,420**	**55,522**	**71,229**	**13,866**	**807,037**
1953	**624,181**	**65,900**	**77,826**	**16,929**	**784,836**
1954	**500,345**	**57,203**	**61,464**	**17,715**	**636,727**
1955	741,997	72,876	53,991	26,035	894.899
1956	727.789	74.887	49.615	24,976	877.267
1957	767,218	75,461	55,413	25,187	923,279
1957:					
Dec.	55,994	5,464	3,930	1,811	67,199
1958:					
Jan.	60,179	5,928	4,508	2,010	72,625
Feb.	52,962	5,045	4,255	1,968	64,230
Mar.	54,816	4,963	4,297	1,962	66,040
Apr.	55,133	4,962	4,621	1,897	66,613
May	55,463	4,805	4,258	1,778	66,304
June	58,507	4,844	4,402	2,053	69,806
July	53,903	4,454	3,791	1,717	63,865
Aug.	59,458	5,719	4,277	2,308	71,762

Exports

1950	**900**	**4,826**	**31**	**1,895**	**7,652**
1951	**483**	**6,825**	**216**	**1,725**	**9,249**
1952	**9,467**	**9,813**	**126**	**2,695**	**22,101**
1953	**7,692**	**11,494**	**237**	**3,245**	**22,668**
1954	**11,069**	**12,062**	**2,831**	**4,155**	**30,117**
1955	60,704	18,098	9,895	4,593	93.290
1956	112,366	21,909	8,699	6,194	149,168
1957	157,977	30,242	8,748	6,377	203,344
1957:					
Nov.	12,639	2,521	809	410	16,379
Dec.	15,549	2,447	814	563	19,373
1958:					
Jan.	14,109	2,649	1,626	513	18,897
Feb.	9,947	2,626	1,415	378	14,366
Mar.	15,647	2,356	757	410	19,170
Apr.	11,583	2,899	949	698	16,129
May	14,067	1,562	1,218	784	16,069
June	11,993	2,403	1,022	473	15,050
July	10,602	....	1,051	674	14,730

Stocks

1949	**77,731**	**4,654**	**12,224**	**3,433**	**98,042**
1950	**36,942**	**5,733**	**7,243**	**2,840**	**52,758**
1951	**105,271**	**8,379**	**12,481**	**3,821**	**129,912**
1952	**83,861**	**8,535**	**22,716**	**3,875**	**118,987**
1953	**135,153**	**11,480**	**24,866**	**4,346**	**175,845**
1954	**115,499**	**11,349**	**19,267**	**4,280**	**150,395**
1955	108,989	12,220	10,500	6.030	137,739
1956	151,763	14,077	28,744	7,934	202,518
1957	140,199	18,843	31,489	7,454	197,985
1957:					
Dec.	140,199	18,843	31,489	7,454	197,985
1958:					
Jan.	152,441	18,691	31,753	7,512	210,397
Feb.	151,501	18,409	31,369	7,635	208,914
Mar.	153,221	18,504	30,796	6,947	209,468
Apr.	143,981	18,764	30,012	6,469	199,226
May	137,277	19,014	29,246	6,392	191,929
June	132,800	18,763	25,954	6,231	183,721
July	132,303	18,242	24,882	6,097	181,524
Aug.	136,735	16,344	24,618	6,224	183,921

Source: U. S. Department of Commerce.

Natural and Synthetic Rubber Latex in the United States

(All Quantities in Long Tons)

New Supply

Year	Natural	GR-S	Neoprene	N-Type	Total Synthetic	Grand Total
1945	4,768	15,176	7,077	.....	22,253	27,021
1946	8,012	24,810	13,595	.....	38,405	46,417
1947	17,675	22,474	6,089	.....	28,563	46,238
1948	32,630	21,494	5,022	.....	26,516	59,146
1949	29,974	21,357	3,651	.....	25,008	54,982
1950	54,401	31,339	5,725	.....	37,064	91,465
1951	54,963	32,972	6,866	2,948	42,786	97,749
1952	48,228	42,273	7,598	4.164	54.035	102.263
1953	75,511	48,112	9,026	5.844	62,982	138,493
1954	74,483	48,379	8,214	6,866	63,459	137,942
1955	92,754	69,364	10,432	10,798	90,594	183,348
1956	72,013	69,720	10,642	10,650	91,012	163,025
1957	72,252	74,535	10,403	11,420	96,358	168,610
1957:						
Sept.	5,516	5,649	917	1,285	7,851	13,367
Oct.	8,351	6,876	885	1,133	8,894	17,245
Nov.	6,496	6,515	1,021	994	8,530	15,026
Dec.	7,572	5,915	704	734	7,353	14,925
1958:						
Jan	6,289	5,998	788	785	7,571	13,860
Feb.	7,013	3,852	765	671	5,288	12,301
Mar.	7,147	4,880	759	787	6,426	13,573
Apr.	6,348	3,889	907	830	5,626	11,974
May	4,121	3,635	808	882	5,325	9,446
June	4,323	4,539	696	890	6,125	10,448
July	4,047	3,645	677	893	5,215	9,262
Aug.	5,326	5,474	892	1,103	7,469	12,795

Consumption[1]

1945	**3,886**	**14,500**	**6,800**	....	**21,300**	**25,186**
1946	**5,714**	**23,500**	**13,000**	....	**36,500**	**42,214**
1947	**13,909**	**22,500**	**6,500**	....	**29,000**	**42,909**
1948	**28,489**	**21,500**	**5,250**	....	**26,750**	**55,239**
1949	**36,117**	**21,500**	**3,750**	....	**25,250**	**61,367**
1950	**56,138**	**31,000**	**5,500**	....	**36,500**	**92,638**
1951	**46,750**	**31,031**	**6,279**	**2,628**	**39,938**	**86,688**
1952	**53,567**	**40,562**	**7,368**	**3,093**	**51,023**	**104,590**
1953	**67,375**	**46,473**	**7,981**	**3,654**	**58,108**	**125,483**
1954	**75,931**	**44,173**	**7,251**	**4,507**	**55,931**	**131,862**
1955	86,478	63,982	8,736	8,495	81,213	167,691
1956	74,082	62,762	8,708	8,021	79,491	153,573
1957	75,009	68,305	9,039	8,630	85,974	160,983
1957:						
Sept.	6,515	5,761	712	753	7,226	13,741
Oct.	7,108	6,654	788	857	8,299	15,407
Nov.	6,650	5,862	725	712	7,299	13,949
Dec.	5,816	5,338	651	606	6,595	12,411
1958:						
Jan.	6,380	5,438	806	683	6,927	13,307
Feb.	5,380	4,475	640	806	5,921	11,301
Mar.	5,560	4,708	633	720	6,061	11,621
Apr.	4,847	4,093	707	797	5,597	10,444
May	5,004	4,102	785	795	5,682	10,686
June	5,304	4,165	639	919	5,723	11,027
July	4,531	3,433	629	703	4,765	9,296
Aug.	6,094	4,654	764	1,025	6,443	12,537

Stocks at End of Period

1945	**3,121**	....	....	....	....	**3,121**
1946	**4,865**	....	....	....	....	**4,865**
1947	**5,033**	....	....	....	....	**5,033**
1948	**11,235**	....	....	....	....	**11,235**
1949	**5,063**	....	....	....	....	**5,063**
1950	**4,927**	....	....	....	....	**4,927**
1951	**4,752**	**3,727**	**1,245**	**532**	**5,504**	**10,256**
1952	**6,201**	**5,040**	**1,019**	**902**	**6,961**	**13,162**
1953	**13,532**	**4,794**	**1,117**	**721**	**6,632**	**20,164**
1954	**11,133**	**5,134**	**1,087**	**811**	**7,032**	**18,165**
1955	13,203	6,980	1,236	1,807	10,203	23,406
1956	12,064	7,451	1,384	1,558	10,393	22,457
1957	14,454	8,347	1,267	1,974	11,588	26,042
1957:						
Sept.	12,315	7,566	1,141	1,700	10,407	22,722
Oct.	12,399	7,254	1,142	1,723	10,119	22,518
Nov.	12,316	7,558	1,265	1,927	10,750	23,066
Dec.	14,454	8,662	1,267	1,974	11,903	26,357
1958:						
Jan.	14,178	8,222	1,190	2,052	11,464	25,642
Feb.	15,506	7,992	1,251	2,297	11,540	27,046
Mar.	16,825	7,991	1,281	1,974	11,246	28,071
Apr.	17,415	7,756	1,398	1,744	10,898	28,313
May	17,604	7,240	1,292	1,732	10,264	27,868
June	17,078	7,337	1,267	1,888	10,492	27,570
July	15,516	6,693	1,312	1,990	9,995	25,511
Aug.	13,750	7,166	1,195	2,049	10,410	24,160

Source: U. S. Department of Commerce.
Note: (1) GR-S and Neoprene consumption estimated through 1956.

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PROVEN ABILITY

to "toughen up" paper . . . . make it more durable, flexible and adaptable for a wide variety of uses.

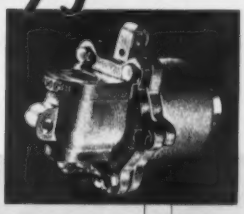
ENDURA is the leading supplier to the pressure-sensitive tape industry. It pioneers many of the technical advances in this field.
Its facilities, resources and technical know-how are always available for new ideas.

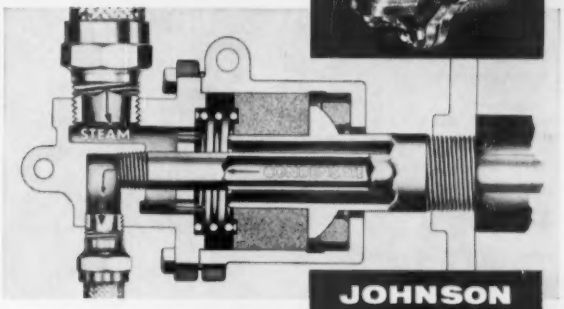
ENDURA® **Impregnated and Coated Papers**

Quakertown 27, Pa.

Need a rotary joint?

. . . for water-cooled or steam-heated rolls . . .





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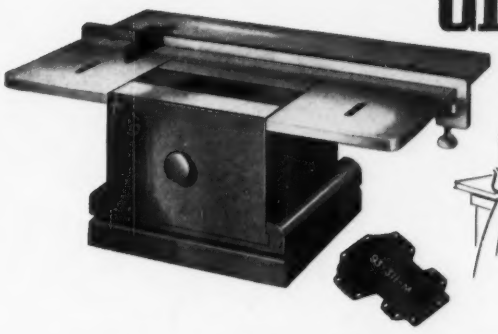
Johnson started the whole idea . . . is far ahead in know-how, available types and sizes. Johnson Joints are completely packless, need no lubrication or adjustment. Used on dryer rolls, mills, waxers, calenders, slashers, printing presses, etc.—handling steam, water, hot heat transfer oils, Dowtherm, Mansanto Aroclors, etc. Actually serving under pressures as high as 2400 psi. Sizes up to 8".

THE JOHNSON CORPORATION
868 Wood St., Three Rivers, Michigan

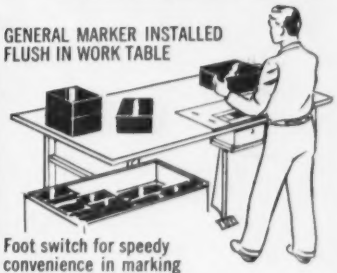
RUBBER MARKING PROBLEMS?

GENERAL SILK SCREEN MARKER



GENERAL MARKER INSTALLED AS BENCH TOP PRINTER

Automatic table pressure switch for high-speed production



GENERAL MARKER INSTALLED FLUSH IN WORK TABLE

Foot switch for speedy convenience in marking large objects

CLEAR, PERMANENT MARKINGS AT PRODUCTION LINE SPEEDS!

- Trade marks, part numbers, patent numbers, instructions, etc. . . printed up to 2500 markings per hour.
- Installs in work table or on bench top . . . mechanism below printing screen . . . leaves unobstructed work space.
- Always ready . . . no washup between work periods . . . enclosed fountain prevents ink drying.
- Quick change screens eliminate delays.
- Prints on rubber, wood, metal, glass, paper, plastic, fibreboard, leather . . . inks available for all surfaces.
- Ruggedly built . . . yet the COST IS AMAZINGLY LOW!

WRITE FOR COMPLETE INFORMATION ABOUT THE GENERAL MARKER AND SPECIAL RUBBER MARKING INKS!

General Research and Supply Company

572 SOUTH DIVISION AVENUE • GRAND RAPIDS, MICHIGAN

Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1951 (total)	**32,153**	**44,612**	**1,677**	**78,442**	**83,405**	**8,765**
Passenger Car	26,729	34,226	723	61,678	65,546	6,973
Truck and Bus	5,424	10,386	954	16,764	17,859	1,791
1952 (total)	**29,484**	**54,342**	**1,520**	**85,346**	**90,411**	**14,110**
Passenger Car	24,106	45,458	741	70,305	74,341	11,251
Truck and Bus	5,378	8,884	779	15,041	16,070	2,859
1953 (total)	**37,949**	**55,124**	**1,543**	**94,617**	**96,150**	**15,720**
Passenger Car	33,106	45,798	809	79,713	81,455	13,044
Truck and Bus	4,843	9,326	734	14,904	14,696	2,676
1954 (total)	**33,333**	**55,155**	**1,753**	**90,241**	**89,141**	**14,762**
Passenger Car	29,741	47,044	928	77,713	76,794	12,217
Truck and Bus	3,591	8,111	826	12,528	12,347	2,545
1955 (total)	**47,374**	**59,246**	**1,879**	**108,499**	**112,178**	**18,778**
Passenger Car	42,574	50,189	966	93,730	97,223	15,963
Truck and Bus	4,800	9,057	912	14,769	14,955	2,815
1956 (total)	**35,422**	**62,146**	**1,757**	**99,325**	**100,406**	**79,872**
Passenger Car	30,873	53,252	875	85,000	85,546	16,494
Truck and Bus	4,548	8,894	883	14,325	14,859	3,378
1957 (total)	**36,765**	**65,150**	**1,733**	**103,649**	**106,940**	**250,536**
Passenger Car	32,725	56,603	889	90,217	93,542	210,146
Truck and Bus	4,053	8,546	846	13,432	13,398	40,384
1957:						
Aug. (total)	3,214	6,488	130	9,833	8,917	18,477
Passenger Car	2,886	5,675	66	8,627	7,801	15,348
Truck and Bus	328	813	65	1,206	1,117	3,129
Sept. (total)	1,688	5,902	133	7,723	8,641	19,393
Passenger Car	1,398	5,096	70	6,564	7,535	16,310
Truck and Bus	290	805	63	1,159	1,105	3,083
Oct. (total)	2,620	5,351	182	8,154	9,708	20,985
Passenger Car	2,298	4,392	88	6,778	8,437	17,998
Truck and Bus	322	960	94	1,375	1,271	2,987
Nov. (total)	3,398	3,630	143	7,171	8,248	22,178
Passenger Car	3,098	3,049	74	6,220	7,098	18,960
Truck and Bus	301	581	70	951	1,150	3,211
Dec. (total)	3,070	3,342	148	6,559	7,615	23,225
Passenger Car	2,803	2,858	78	5,739	6,597	19,818
Truck and Bus	267	484	70	820	1,018	3,408
1958:						
Jan. (total)	2,653	5,511	107	8,271	7,814	22,769
Passenger Car	2,377	4,838	50	7,264	6,740	19,299
Truck and Bus	277	674	57	1,007	1,074	3,470
Feb. (total)	2,253	4,374	110	6,737	7,314	23,392
Passenger Car	1,998	3,777	57	5,833	6,320	19,820
Truck and Bus	254	598	52	904	994	3,572
Mar. (total)	2,114	5,334	95	7,543	7,573	23,446
Passenger Car	1,845	4,726	49	6,621	6,569	19,786
Truck and Bus	269	608	46	923	1,004	3,659
Apr. (total)	1,876	6,183	116	8,175	7,477	22,658
Passenger Car	1,594	5,517	61	7,173	6,522	19,051
Truck and Bus	282	666	55	1,002	955	3,607
May (total)	2,173	6,220	110	8,503	7,653	21,834
Passenger Car	1,874	5,593	56	7,523	6,715	18,263
Truck and Bus	299	626	54	980	938	3,571
June (total)	1,932	7,182	117	9,231	8,293	20,920
Passenger Car	1,667	6,387	63	8,117	7,306	17,465
Truck and Bus	265	794	54	1,113	988	3,456
July (total)	2,020	7,442	111	9,573	7,288	18,615
Passenger Car	1,756	6,502	60	8,318	6,368	15,501
Truck and Bus	265	940	51	1,255	920	3,114
Aug. (total)	1,055	6,679	115	7,848	7,762	18,521
Passenger Car	847	5,807	57	6,711	6,753	15,535
Truck and Bus	208	871	57	1,137	1,009	2,986

Source: The Rubber Manufacturers Association, Inc.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1938	2,000,985	485,852	2,486,837	1948	3,909,270	1,363,856	5,273,126
1939	2,866,796	704,308	3,571,104	1949	5,108,841	1,123,736	6,232,577
1940	3,692,328	721,637	4,413,965	1950	6,665,836	1,332,263	7,998,099
1941	3,744,500	875,381	4,619,681	1951	5,337,729	1,420,432	6,758,161
1942	220,814	133,083	353,897	1952	4,320,794	1,212,790	5,533,584
1943	0	4,501	4,501	1953	6,121,787	1,202,196	7,323,983
1944	0	124,819	124,819	1954	5,558,897	1,038,045	6,596,942
1945	83,792	313,643	397,435	1955	7,920,186	1,245,018	9,165,204
1946	2,148,699	930,760	3,079,429	1956	5,816,109	1,100,417	6,916,526
1947	3,558,178	1,220,634	4,778,812	1957	6,113,344	1,097,006	7,210,350
1957:							
Jan.	628,045	91,117	719,162	July	484,718	96,048	580,766
Feb.	570,023	91,767	661,790	Aug.	521,282	90,152	611,434
Mar.	585,734	91,703	676,437	Sept.	318,279	63,131	381,410
Apr.	541,733	105,175	646,908	Oct.	291,064	88,879	379,943
May	537,112	102,312	639,424	Nov.	583,783	94,574	678,357
June	496,329	94,321	590,650	Dec.	555,242	87,327	642,569
1958:							
Jan.	478,416	79,790	558,206	July	316,408	65,048	381,456
Feb.	396,221	71,024	467,245	Aug.	194,974	55,227	250,201
Mar.	359,464	73,668	433,332	Sept.	.....	.....	.....
Apr.	322,482	73,899	396,381	Oct.	.....	.....	.....
May	352,076	75,303	427,379	Nov.	.....	.....	.....
June	342,228	70,663	412,891	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.
Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Automotive Inner Tubes

(Thousands of Units)

	Shipments					
Year	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1946	**15,327**	**59,357**	**1,424**	**76,108**	**77,251**	**3,820**
1947	**25,046**	**46,560**	**2,483**	**74,088**	**79,181**	**8,059**
1948	**26,833**	**40,548**	**1,119**	**68,499**	**70,033**	**9,641**
1949	**31,521**	**31,450**	**887**	**63,858**	**65,114**	**10,657**
1950	**41,240**	**42,671**	**811**	**84,723**	**80,179**	**....**
1951	**32,151**	**32,284**	**1,071**	**65,507**	**67,249**	**10,094**
1952	**29,451**	**32,985**	**1,014**	**63,449**	**65,073**	**12,036**
1953	**37,957**	**36,072**	**878**	**74,907**	**74,425**	**11,874**
1954	**25,071**	**35,576**	**945**	**61,593**	**48,279**	**9,519**
1955	**5,001**	**33,387**	**1,001**	**39,389**	**35,900**	**6,833**
1956	**3,100**	**32,358**	**1,040**	**36,498**	**34,405**	**6,109**
1957	**3,046**	**35,687**	**1,076**	**39,806**	**39,774**	**80,077**
1957:						
Nov.	237	2,403	96	2,736	3,243	7,444
Dec.	225	2,392	101	2,717	2,778	7,671
1958:						
Jan.	232	4,005	72	4,309	3,344	6,700
Feb.	209	3,014	73	3,412	3,444	6,866
Mar.	209	3,481	74	3,764	3,685	7,066
Apr.	201	2,978	64	3,243	3,624	7,609
May	225	2,742	68	3,035	3,530	8,189
June	202	3,332	67	3,602	3,476	8,156
July	215	3,174	76	3,466	2,890	7,680
Aug.	160	3,097	74	3,331	3,305	7,664

Source: The Rubber Manufacturers Association, Inc.

Vinyl and Vinyl Copolymer Resins—Sales

(Thousands of Pounds—Resin Content)

	Polyvinyl Chloride and Copolymer Resins							All Other Vinyl Resins		
	Film	Sheeting	Molding & Extrusion	Textile & Paper Treating	Flooring	Protective Coatings	All Other Uses	Adhesives	All Other Uses	Grand Total
1953	**63,691**	**62,385**	**129,215**	**52,353**	**22,152**	**22,823**	**27,790**	**22,411**	**77,478**	**480,299**
1954	**69,943**	**56,588**	**147,284**	**49,546**	**34,890**	**23,676**	**35,148**	**26,609**	**74,090**	**517,773**
1955	**83,276**	**51,424**	**183,736**	**64,223**	**56,357**	**27,439**	**53,868**	**31,853**	**105,644**	**657,821**
1956	**78,063**	**55,598**	**206,726**	**62,931**	**65,384**	**28,522**	**71,859**	**36,565**	**115,151**	**720,799**
1957	**90,543**	**56,344**	**216,517**	**66,392**	**81,357**	**31,519**	**50,637**	**41,665**	**113,396**	**748,370**
1957:										
July	6,342	4,362	14,340	5,371	6,030	2,755	2,872	3,236	7,976	53,284
Aug.	7,121	4,941	17,962	6,884	7,553	2,515	4,252	3,677	9,011	63,916
Sept.	9,406	4,987	18,653	6,542	7,156	2,363	4,189	3,191	8,771	65,258
Oct.	10,747	5,102	21,712	6,802	7,506	2,256	4,466	3,771	10,887	73,249
Nov.	5,569	5,142	16,940	6,151	6,224	1,916	6,211	3,197	9,265	60,615
Dec.	4,231	4,396	14,002	3,936	6,176	2,073	5,345	2,896	8,292	51,347
1958:										
Jan.	5,870	4,119	16,361	4,035	7,562	2,885	4,071	3,213	10,780	58,896
Feb.	5,902	4,412	13,907	4,468	7,964	2,250	3,369	3,484	9,193	54,949
Mar.	6,530	4,248	15,340	3,863	9,215	2,322	3,760	3,941	9,036	58,255
Apr.	5,424	4,643	15,705	3,881	9,079	2,056	5,287	4,087	9,696	59,858
May	5,534	5,331	15,958	4,769	10,347	2,518	5,519	3,675	9,149	64,800
June	5,986	5,716	16,205	5,462	9,117	2,518	4,020	3,932	9,399	62,355
July	4,796	5,330	15,520	4,883	8,093	2,526	3,860	4,381	4,362	53,751
Aug.	6,594	5,547	19,286	6,245	10,530	2,810	6,002	9,194	9,497	75,705

Source: Chemical Division, U. S. Tariff Commission.

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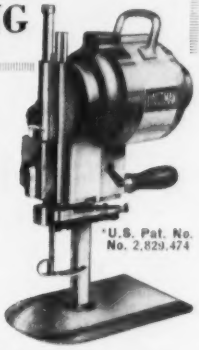
for QUICK, EASY, ACCURATE
RUBBER CUTTING



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- All types of Coated materials
- Rubber Sheeting and Slabs

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35% Longer Blade Life!

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Special knife edges — sawtooth, wave-edge, etc. — and knife moistening device makes cutting easy. ONLY Eastman automatic BELT-sharpening can sharpen these knives correctly.

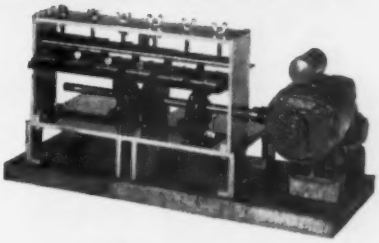
EASTMAN "LIGHTNING"
for cutting straight lines and easy curves. Automatic sharpening renews knife while machine is cutting.

Strip-Cutters and Skivers also available. Send for Circular
Representatives everywhere.

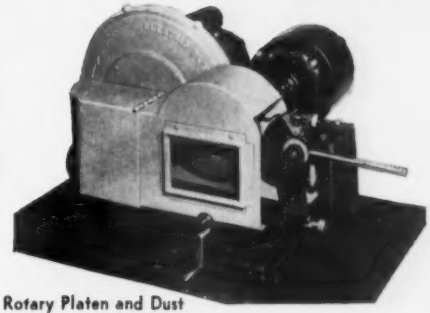
EASTMAN MACHINE COMPANY, BUFFALO 3, N. Y.

LABORATORY APPARATUS for the RUBBER INDUSTRY

ROSS RUBBER FLEXING MACHINE
(for ASTM D1052)



RUBBER SAMPLE BUFFING MACHINE



(Shown with Rotary Platen and Dust Collector with Suction Blower.)

EMERSON APPARATUS CO.
183 Tremont St., Melrose, Mass.

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Vulcanized Oil

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THE STAMFORD RUBBER SUPPLY COMPANY, STAMFORD, CONN.

Rubber Industry Employment Earnings and Hours

All Rubber Products

Mo.	1957 Production Workers (thousands)	1957 Average Weekly Earnings	1957 Average Weekly Hours	1957 Average Hourly Earnings	1958 Production Workers (thousands)	1958 Average Weekly Earnings	1958 Average Weekly Hours	1958 Average Hourly Earnings
Jan.	216.0	$91.21	40.9	$2.23	200.9	$87.48	38.2	$2.29
Feb.	212.6	90.80	40.9	2.22	191.3	85.04	37.3	2.28
Mar.	211.4	89.28	40.4	2.21	184.0	87.02	38.0	2.29
Apr.	191.3	87.60	40.0	2.19	176.0	85.88	37.5	2.29
May	204.2	88.80	40.0	2.22	172.3	87.86	38.2	2.30
June	196.8	91.21	40.9	2.23	175.8	91.10	39.1	2.33
July	199.8	94.16	41.3	2.28	175.2	92.12	39.2	2.35
Aug.	204.3	92.84	40.9	2.27	179.7	....	...	...
Sept.	206.4	92.97	40.6	2.29	....	....	...	...
Oct.	209.5	93.03	40.1	2.32	....	....	...	...
Nov.	209.0	93.20	40.0	2.33	....	....	...	...
Dec.	207.3	92.40	40.0	2.31	....	....	...	...
Tires and Tubes								
Jan.	87.4	107.64	41.4	2.60	81.6	98.52	36.9	2.67
Feb.	86.8	106.19	41.0	2.59	78.5	93.02	35.1	2.65
Mar.	86.9	102.40	40.0	2.56	76.0	98.05	37.0	2.65
Apr.	71.1	103.46	40.1	2.58	72.1	95.67	36.1	2.65
May	84.9	103.46	40.1	2.58	70.4	99.48	37.4	2.66
June	78.2	107.23	41.4	2.59	71.2	103.63	38.1	2.72
July	83.9	112.20	42.5	2.64	71.0	106.59	38.9	2.74
Aug.	84.2	107.83	41.0	2.63	.. .	....	...	...
Sept.	84.4	107.20	40.3	2.66	....	....	...	...
Oct.	84.4	105.18	39.1	2.69	....	....	...	...
Nov.	84.0	106.62	39.2	2.72	....	....	...	...
Dec.	83.6	105.84	39.2	2.70	....	.. .	...	...
Rubber Footwear								
Jan.	18.3	71.76	39.0	1.84	17.5	74.87	39.2	1.91
Feb.	17.8	72.10	39.4	1.83	17.0	74.68	39.1	1.91
Mar.	17.8	72.68	39.5	1.84	16.7	76.61	39.9	1.92
Apr.	17.5	70.64	38.6	1.83	16.5	75.46	39.3	1.92
May	17.3	71.92	39.3	1.83	16.3	75.85	39.3	1.93
June	17.4	72.29	39.5	1.83	16.3	77.20	40.0	1.93
July	16.8	72.13	39.2	1.84	15.9	75.25	39.4	1.91
Aug.	17.2	73.05	39.7	1.84	....	....	...	...
Sept.	17.6	74.45	39.6	1.88	....	....	...	...
Oct.	17.7	76.02	39.8	1.91	....	....	...	...
Nov.	18.0	78.96	40.7	1.94	....	....	...	...
Dec.	17.9	79.35	40.9	1.94	....	....	...	...
All Other Rubber Products								
Jan.	110.3	81.39	40.9	1.99	101.8	80.94	39.1	2.07
Feb.	108.0	81.18	41.0	1.98	95.8	80.32	38.8	2.07
Mar.	106.7	81.19	40.8	1.99	91.3	79.87	38.4	2.08
Apr.	102.7	79.60	40.2	1.98	87.4	79.87	38.4	2.08
May	102.0	79.80	40.1	1.99	85.6	80.29	38.6	2.08
June	101.2	81.81	40.7	2.01	88.3	83.77	39.7	2.11
July	99.1	82.62	40.7	2.03	88.3	83.53	39.4	2.12
Aug.	102.9	83.84	41.1	2.04	....	....	...	...
Sept.	104.4	85.08	41.1	2.07	....	....	...	...
Oct.	107.4	86.10	41.0	2.10	....	....	...	...
Nov.	107.0	85.05	40.5	2.10	....	....	...	...
Dec.	105.8	84.03	40.4	2.08	....	....	...	...

Source: U. S. Department of Labor.
Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who work during, or received pay for, any part of the pay period ending nearest the 15th of the month. These employment series have been adjusted to first quarter 1954 benchmark levels indicated by data from government social insurance programs. Hours and earnings data pertain only to production and related workers.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1951	1952	1953	1954	1955	1956	1957	1958
Jan.	45.04	42.96	33.24	34.15	35.07	35.24	34.82	36.31
Feb.	(a)	41.64	33.76	35.00	35.04	36.26	34.82	35.83
Mar.	46.06	41.70	34.10	35.23	34.33	36.70	35.35	36.05
Apr.	46.60	41.79	33.85	35.22	34.23	36.81	35.43	36.00
May	46.06	39.98	34.30	35.34	34.80	36.65	35.40	36.27
June	46.06	41.31	34.11	35.17	34.83	36.67	35.45	36.33
July	46.21	40.37	34.20	35.37	34.61	35.43	35.49	36.51
Aug.	35.93	40.42	33.82	35.19	34.53	34.31	35.15	36.36
Sept.	36.20	39.75	33.69	35.46	33.85	34.35	34.74	36.00
Oct.	38.13	37.52	33.53	35.24	33.93	34.45	35.09	36.23
Nov.	42.70	35.59	33.60	34.80	34.87	34.56	36.06	....
Dec.	43.32	33.76	33.52	35.03	34.95	34.56	36.50	....
Average for Year	42.43	39.71	33.81	35.10	34.59	35.50	35.36	....

Note: The Government established a ceiling of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Production Index for the Rubber Industry

(1947-1949 = 100)

(Based on man-hours)

	1956	1957	1958		1956	1957	1958
Jan.	147	145	116	July	125	136	125
Feb.	140	141	114	Aug.	135	141	132
Mar.	135	145	116	Sept.	132	138	...
Apr.	136	132	112	Oct.	134	135	...
May	127	134	113	Nov.	126	131	...
June	120	135	125	Dec.	137	117	...

Sales by the Rubber Industry

(in Millions of Dollars*)

	1956	1957	1958		1956	1957	1958
Jan.	415	496	448	July	459	514	478
Feb.	445	495	413	Aug.	436	514	...
Mar.	451	476	396	Sept.	429	481	...
Apr.	445	490	429	Oct.	454	490	...
May	464	481	428	Nov.	463	431	...
June	450	458	445	Dec.	461	427	...

Rubber Manufacturers' Inventories

(in Millions of Dollars*)

	1956	1957	1958		1956	1957	1958
Jan.	935	1,047	1,100	July	987	1,045	980
Feb.	970	1,036	1,087	Aug.	1,007	1,074	...
Mar.	979	1,030	1,069	Sept.	1,007	1,074	...
Apr.	970	1,031	1,047	Oct.	1,002	1,097	...
May	985	1,024	1,020	Nov.	1,024	1,101	...
June	975	1,027	986	Dec.	998	1,092	...

Source: U. S. Department of Commerce.
Notes: * Adjusted for seasonal variation.

No. 1 R.S.S.—Annual Average Prices

(New York Market—Cents per Pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1916	102	55	72.50	1937	26⅞	14	19.39
1917	90	52	72.23	1938	17⅞	10¼	14.64
1918	70	40	60.15	1939	24	14⅛	17.57
1919	57	38½	48.70	1940	24	18¼	20.10
1920	56½	16	36.30	1941	24⅞	19⅛	22.40
1921	21¾	11½	16.36	1942	22½	22½	22.50
1922	28⅜	13⅜	17.50	1943	22½	22½	22.50
1923	37⅛	24¾	29.45	1944	22½	22½	22.50
1924	40⅛	17⅜	26.20	1945	22½	22½	22.50
1925	121	34⅜	72.46	1946	22½	22½	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41¾	33	37.72	1948	25	18	21.99
1928	41¼	17	22.48	1949	19¾	15⅞	17.57
1929	26⅞	15½	20.55	1950	86	18	41.10
1930	16½	7½	11.98	1951	76	52	(a)
1931	8⅝	4¼	6.17	1952*	33	26½	29.15
1932	4¾	2½	3.49	1953	31⅜	19⅞	24.21
1933	9⅞	2⅜	5.96	1954	34½	19½	23.61
1934	15⅞	8¾	12.92	1955	52	29⅜	39.16
1935	13¾	10½	12.37	1956	45	26½	34.24
1936	23	13½	16.41	1957	37⅜	26⅝	31.13

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947. (a) Free trading suspended March 31, 1951. GSA selling price ranged between 52 and 66c during balance of year. * Free trading was resumed on July 1, 1952; figures represent only July through December, 1952.

No. 1 R.S.S.—Monthly Average Prices

(New York Market—Cents per pound)

	1951	1952	1953	1954	1955	1956	1957	1958
Jan.	71.21	....	29.40	20.22	33.92	41.70	33.32	27.15
Feb.	73.61	....	27.57	19.98	34.90	33.68	30.43	26.32
Mar.	72.05	....	26.59	20.16	31.08	33.68	31.76	26.64
Apr.	....	....	24.66	22.06	31.75	31.74	32.23	26.44
May	....	....	25.52	21.96	31.35	29.61	32.12	25.51
June	....	....	24.42	23.01	34.74	30.54	32.80	26.20
July	....	30.52	23.64	24.12	40.84	33.91	32.88	27.70
Aug.	....	29.36	23.36	23.26	45.85	35.69	32.13	28.72
Sept.	....	27.42	23.06	23.99	48.27	32.64	29.94	29.49
Oct.	....	27.26	20.82	26.57	43.81	32.68	29.24	31.06
Nov.	....	29.25	20.58	28.07	44.95	35.18	27.47	....
Dec.	....	31.26	20.92	29.88	48.40	37.01	29.25	....
Average for Year	(a)	29.15	24.21	23.61	39.16	34.24	31.13	....

Note: (a) Free trading suspended March 31, 1951, and resumed on July 1, 1952.

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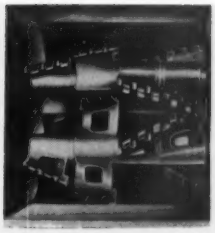

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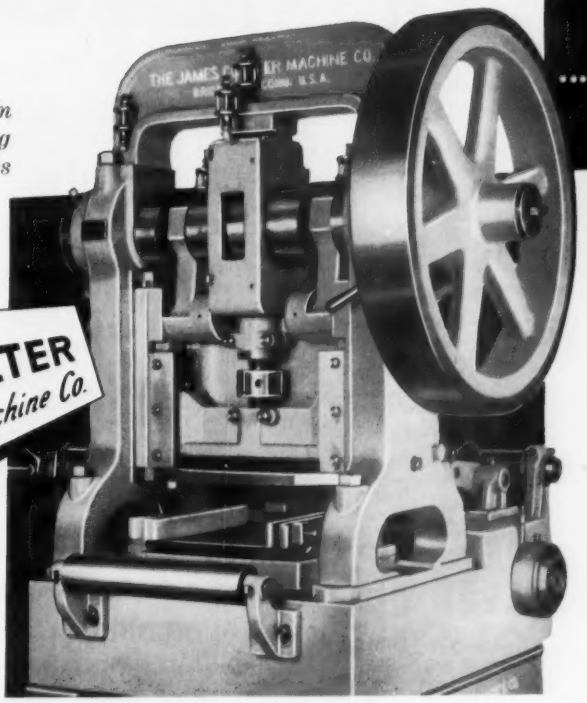

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Various Compounding Materials Consumed by the Rubber Industry

Material	1950	1951	1952	1953	1954	1955	1956
Antimony, Primary							
Short tons	103[c]	19[c]	66[c]	20[c]	49[c]	78	56
% of total	.007	.001	.004	.001	.004	006	.013
Asphalt:[a]							
Short tons	26,819	21,414	33,288	.....	.....	.....	.....
% of total	0.3	0.3	0.4	.....	.....	.....	.....
Barite (Barytes):							
Short tons	19,000	15,000	18,000	21,000	20,000	25,104	22,101
% of total	3.31	2.13	2.0	2 0	2.0	2.0	2.0
Carbon Black:							
Short tons	515,184	530,614	537,273	566,797	511,813	643,430	622,325
% of total	92.9	93.9	93.1	94.4	93.5	93.5	95.5
Clay, Kaolin:							
Short tons	263,306	231,331	240,982	241,052	247,431	257,223	268,157
% of total	15.0	12.7	13.2	12.8	13.2	11.9	12.0
Clay, Fire & Stoneware:							
Short tons	9,500	.....	9,322	18,475	8,781	2,928	.....
% of total	0.1	.....	0.1	.2	.1	.2	.....
Lime:							
Short tons	908	1,126	2,000	1,631	1,555	1,465	2,487
% of total	.0002	[d]	[d]	[d]	[d]	[d]	[d]
Litharge:							
Short tons	3,047	2,641	2,109	2,230	1,768	1,947	2,266
% of total	1.7	1.1	1.5	1.4	1.3	1.3	1.7
Lithopone:							
Short tons	4,092	3,295	1,523	1,723	1,701	2,163	2,000[e]
% of total	3.9	3.2	2.5	3.3	3.9	5.0	5.0
Mica, Ground:							
Short tons	5,776	6,551	5,126	5,668	5,021	7,339	7,021
% of total	8.0	9.0	7.0	7.8	6.3	6.9	8.0
Sulfur:							
Short tons	75,000	84,000	84,000	89,600	84,000	89,600	89,600
% of total	1.3	1.4	1.4	1.4	1.3	1.2	1.1
Talc:[b]							
Short tons	75,900	70,970	64,476	61,408	58,139	38,309	30,253
% of total	12.0	11.2	10.9	10.0	9.7	5.4	5.0
Zinc Oxide:							
Short tons	82,944	71,507	72,774	78,439	71,058	86,677	90,000[e]
% of total	51.6	48.4	51.2	52.7	50.7	51.5	52.0

Source: U. S. Bureau of Mines.
Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes prophyllite and ground soapstone. (c) Does not include precipitated antimony sulfide as in previous years. (d) Negligible. (e) Estimated.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	New Supply	Consumption: Tons	Consumption: % to Crude[a]	Exports	Stocks On Hand at End of Period
1941	274,202	251,231	32.2	13,851	41,750
1942	286.00[b]	254,820	64.6	30,405	42,332
1943	304,058[c]	291,082	59.6	15,678	46,201
1944	260,631[d]	251,083	35.3	11,800	43,832
1945	243.309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35.943
1948	266,861	261,113	24.4	11,428	32,630
1949	224,029	226,679	22.5	10,637	28,263
1950	314,008	303,733	24.1	11,740	35,708
1951	366.700	346,121	25.6	14,722	45,082
1952	274,981	280.002	22.2	11,180	30,664
1953	298.336	285,050	21.3	11,597	32,319
1954	258,101	249.049	20.2	10,232	30,746
1955	326.649	312.781	20.4	13.988	31,498
1956	287,220	270.547	18.8	13.832	34.969
1957	271,647	267.352	18.2	13,021	29,323
1957:					
July	20.469	19.676	18.1	757	29,972
Aug.	20,432	22,429	18.1	917	28,521
Sept.	19,892	21,704	17.9	714	25,983
Oct.	26,419	24.925	18.1	1,230	27,171
Nov.	22,083	20,583	17.3	1,150	27,855
Dec.	20,101	18.263	17.2	843	29,323
1958:					
Jan.	21,958	21,186	18.4	892	29,569
Feb.	19,017	18,130	18.0	665	28,838
Mar.	20,225	19,300	18.5	1,012	28,984
Apr.	20,735	19,746	19.1	832	29,440
May	19,601	20,104	19.6	1,012	27,862
June	21,230	20,652	19.2	1,024	27,763
July	18,122	18,350	18.2	1,087	26,442
Aug.	22,432	19,347	17.4	....	27,961

Source: U. S. Bureau of Mines.
Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes prophyllite and ground soapstone. (c) Does not include precipitated antimony sulfide as in previous years. (d) Negligible. (e) Estimated.

Cotton, Rayon and Nylon Tire Fabrics

(In Thousands of Pounds)

	Production: Rayon Tire Cord Not Woven	Production: Rayon Tire Cord Woven	Production: Cotton and Nylon Cord & Fabric[a]	Production: Chafer Fabrics (all fibers)	Production: Total Tire Cord and Fabric	Stocks[b]: Cotton and Nylon Cord & Fabric	Stocks[b]: Rayon Cord and Fabric
1957:							
Jan.-Mar.	21,853	68.825	31,393	11,028	123.182	11,844	37,153
Apr.-June	16,037	63,195	35,308	10,456	115,418	13,428	13,473
July-Sept.	10,509	54,968	33,477	9,147	100,091	13,305	36,388
Oct.-Dec.	9,216	58,392	32,827	10,176	101,687	14,909	29,632
Total	57,615	245,380	133,005	40.807	440,378	53,486	116,646
1958:							
Jan.-Mar.	8,372	56,522	25,647	7,367	92,924	11,255	33,913
Apr.-June	.....	.....	30,745	6,020	80,533	11,274	26,327
July-Sept.	.....	.....	.....	.....	.....	.....	.....
Oct.-Dec.	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....

Source: Bureau of the Census, U. S. Department of Commerce.
Notes: (a) Combined to avoid disclosing figures for individual companies. (b) At end of period.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1952	1953	1954	1955	1956	1957	1958
Jan.	86,863	89,634	89,852	96,397	100,642	109,295	107,281
Feb.	82,043	86,458	86,206	88,464	98,088	96,694	95,516
Mar.	87,065	98,158	101,549	105,684	112,412	113,166	108,914
Apr.	98,563	102,044	103,866	111,116	113,034	115,820	118,477
May	101,137	105,918	104,418	115,707	123,560	124,325	125,137
June	99,305	114,703	113,037	120,710	126,838	121,598	125,444
July	105,307	112,969	112,231	115,653	120,708	130,251	130,779
Aug.	102,954	109,124	110,223	121,816	125,847	128,808	.....
Sept.	100,095	106,158	104,706	113,379	111,574	113,567	.....
Oct.	103,689	106,037	105,607	112,558	119,204	119,334	.....
Nov.	91,326	99,210	102,393	109,212	112,113	107,705	.....
Dec.	95,817	100,225	104,258	111,034	108,096	112,691	.....
Total	1,154,254	1,230,629	1,238,346	1,321,730	1,372,116	1,393,254	.....

Source: U. S. Bureau of Mines.

U. S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

Year	Balata: Tons	Balata: Value	Jelutong: Tons	Jelutong: Value	Gutta-Percha & Other Guttas: Tons	Gutta-Percha & Other Guttas: Value
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1948	1,195	805,078	3,401	2,377,765	423	542,788
1949	1,391	814,554	1,043	834,978	197	189,021
1950	2,117	1,589,885	1,789	1.515,162	541	745,418
1951	2,452	1,973,271	1,669	2,608,359	383	430,539
1952	988	762,994	1,636	2,094,983	282	385,890
1953	1,619	866,248	1,027	1,166.837	235	303,116
1954	949	504,065	2,196	2,624,926	417	511,055
1955	1,022	967,369	1,679	1,731,821	284	318,115
1956	1,396	1,111,165	1,851	1.909.447	290	309,615
1957	1,037	670,821	1,680	1,942,067	230	270,487
1957:						
Nov.	110	85,126	117	136,806	2	13,797
Dec.	71	55,902	136	144,229	....	.....
1958:						
Jan.	10	9,732	122	132,581	6	12,975
Feb.	4	3,390	46	45,507	7	19,454
Mar.	33	21,631	98	98,250	8	13,126
Apr.	6	2,787	74	75,302	17	19,187
May	242	131,642	131	151,130	22	35,366
June	16	11,515	89	108,419	21	28,739

Source: U. S. Department of Commerce.

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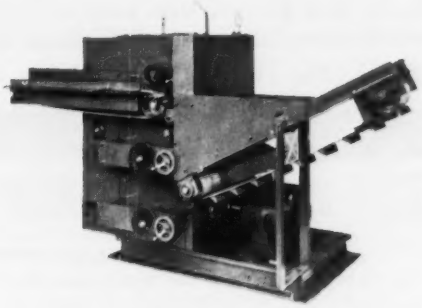

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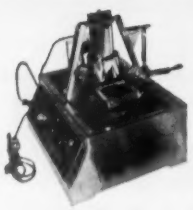

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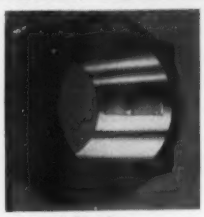

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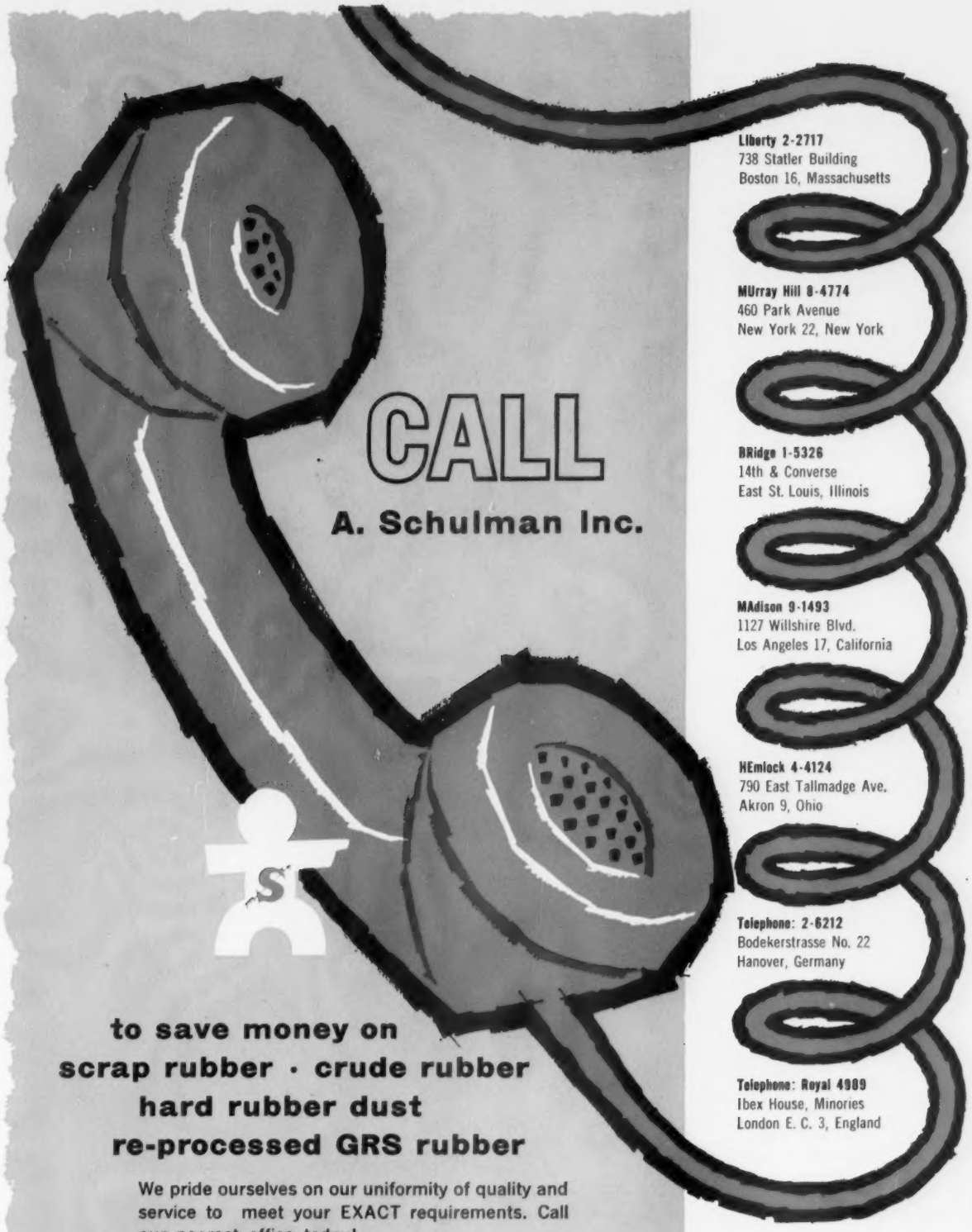

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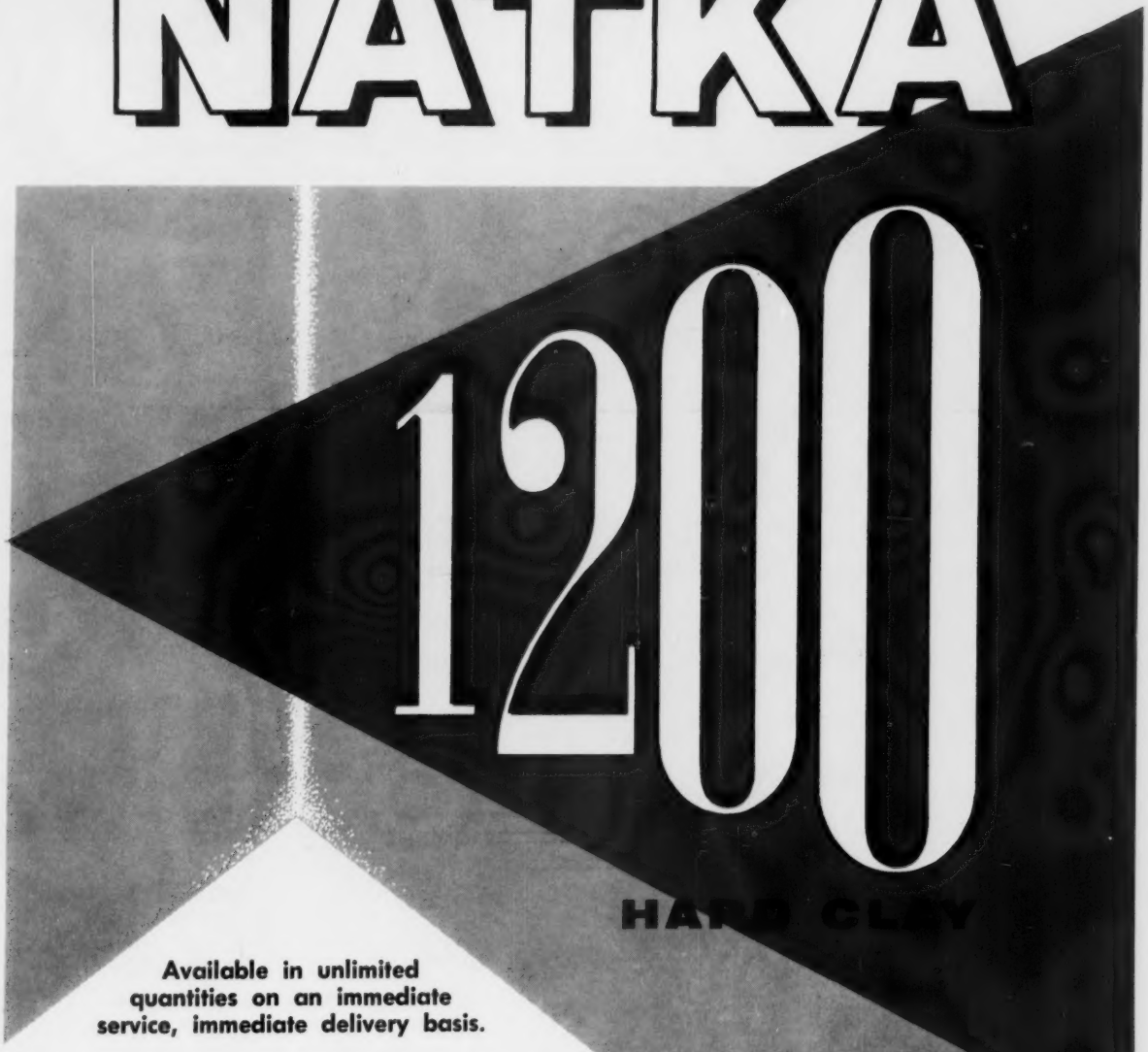

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